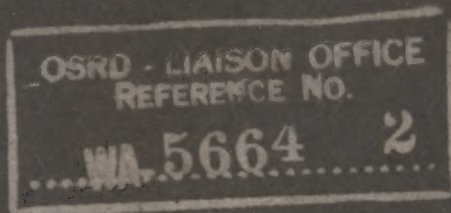


RESTRICTED

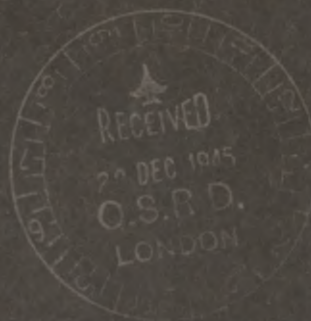
CLASSIFICATION OF THIS REPORT  
HAS BEEN REDUCED TO

OPEN



GROUP 4  
Downgraded at 5 year intervals;  
declassified after 15 years

## GERMAN MEDICAL SCHOOLS



RESTRICTED

CLASSIFICATION OF THIS REPORT  
HAS BEEN REDUCED TO

OPEN

COMBINED INTELLIGENCE OBJECTIVES  
SUB-COMMITTEE

RESTRICTED

## INVESTIGATION OF CERTAIN GERMAN MEDICAL SCHOOLS,

## Reported By:

Brigadier Sir STEWART DUKE-ELDER, RAMC,  
Brigadier D. W. DAGGETT, RAMC,  
Captain R. CANNON ELEY (MC) USNR  
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## CIOS Target Numbers

24/17a, 24/31, 24/159a, 24/186, 24/194, 24/205  
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## Medical

COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE  
G-2 Division, SHAETF (Rear), AFO 413

RESTRICTED

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INSTITUTIONS VISITED

Universities of Heidelberg, Freiberg, Tubingen, Erlangen and Innsbruck; Brain Research Institute, Neustadt, Black Forest; Sports Hospital, Rehabilitation Hospital and Dr Henschke's Research Laboratory, Garmisch-Partenkirchen; Stadtkrankenhaus, Furth.

PERSONNEL OF INSPECTION TEAM

Brigadier Sir Stewart DUKE-ELDER, RAMC, (Team Leader)  
 Brigadier D. W. DAGGETT, RAMC,  
 Captain R. CANNON ELEY, MC, USNR (Deputy Team Leader),  
 Lieutenant Colonel ELBERT L. PERSONS, MC, USFET  
 Major WINFIELD L. BUTSCH, MC, USFET.

# I. OPHTHALMOLOGY

Interview with Professor Engelking,  
Professor of Ophthalmology, University of Heidelberg,  
14 July, 1945

The department of ophthalmology in Heidelberg University is one of the oldest and most famous in Europe. Professor Engelking who is, and has been for some years, in charge of the department is one of the best of German ophthalmologists. I had known him before the war; although one of the leading figures in his branch of surgery, he was not a member of the Nazi party. He was most cooperative and I have no reason to doubt any of his statements.

The Augenklinik is an old building, practically undamaged by the war, except for the effects of one long-distance shell which damaged one room. Of the original staff of 12 assistants, 6 remain and 6 are military prisoners of war.

## German Ophthalmology in the War

Briefly, German ophthalmology has not progressed in any degree since I knew it in 1939. There have been no new techniques in diagnosis, therapeusis, medical treatment or surgery. Professor Engelking assured me that this applied all over Germany, and certainly on going over the clinic, examining his patients and observing the treatment, this statement was fully borne out, both with regard to the treatment of medical cases (conjunctivitis, iritis, choroiditis, etc.) and surgical conditions (cataract, glaucoma, detachment of the retina, etc). There was a considerable number of war wounded in hospital, mostly long-term orbital deformities: these were undergoing plastic procedures - the classical Imre flaps in the periorbital region, Tiersch grafting for lids and mucous membrane grafting for socket reconstruction - all well-known methods with nothing new to be learned therefrom. No ophthalmic publications of any note seem to have appeared during the war years. Original research in Heidelberg seems to have been non-existent for some years.

Prostheses in use are the old-fashioned glass eyes with which Germany used to supply a large part of the world. There appears to have been no work on plastic artificial eyes such as has been developed in England and America during the war years. The supply of glass eyes for Heidelberg came from a factory in Wiesbaden which apparently is destroyed; and at Heidelberg they appear to contemplate a complete absence of prostheses when their present stocks have run out.



The definition of blindness throughout Germany is taken as a limit of vision of  $1/20$ . Soldiers coming into this category were rehabilitated in vocational centres up till recently; I was told there was a very large centre of this type in Berlin, but nothing is being done in this respect locally at present. So far as I could discover no detailed scheme of this nature was ever open to civilians, except that children were cared for and taught in special institutions run by the Nazi party. This apparently is a comparatively recent development.

Shortages. The staff at the Augenklinik appear to be much exercised by the question of shortages of material which has been becoming apparent for the last six months and is now acute. Spectacle lenses are now in very short supply and in many cases are unobtainable, the factories having been destroyed; recently supplies for the Army have been short and for civilians non-existent. Some drugs are also lacking: pilocarpine, for example is very short. I was told that there are now 30 gms available for a population of 10 millions in the Heidelberg area. Professor Engelking told me that as a result of this every case of glaucoma was presented with no other alternative than operation. Alcohol is also so short as to make it impossible to prepare pathological specimens. The replacement of surgical instruments is a further complaint; cataract knives, for example, have been recently sent to Switzerland for sharpening, the delay being some 9 months. The operation for transplantation of the cornea has ceased owing to the lack of necessary trephines. And so on. It is interesting that in discussing these matters it seems difficult to get the view across that these shortages are ultimately the fault of the German nation, and that for the same reason we and other countries have had as severe, if not more severe shortages. Their attitude is a somewhat naive one that they need not worry too much about it for the American Army will certainly become the Universal Fairy Godmother whenever they learn about their troubles.

On the whole I would conclude that nothing of importance has emerged from German ophthalmology during the war; that in this specialty we have beaten them completely, and that their present psychology is one of passivity and apathy.

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Interview with Prof Dr. Stock  
Dean of Medical Faculty and Professor of Ophthalmology,  
University of Tübingen

Ophthalmic Prostheses

Prof. Stock stated that he has about 5,000 glass eyes from which to select when prostheses are needed. When special difficulties occur, either for colour matching, or because of an abnormal socket, a special prosthesis is made when he sends the patient to an expert in Stuttgart. No difficulties have been experienced. He has never heard of plastic eye prostheses.

Interview with Dr. Keidel  
Bavrischer Hof, Garmisch-Partenkirchen

Dr. Keidel has been working on apparatus to aid the blind. Essentially he has two lines of research:

(1) An instrument which converts varying intensity of light into tones of varying pitch. It is intended to be carried by blind persons so that the ear shall act as a substitute for the eye and objects will be distinguished by the amount of light they absorb or reflect.

(2) An apparatus which eventually may enable the blind to appreciate the printed word by picking out different letters of the alphabet and converting them into sounds of different pitch. This apparatus is not developed further than the stage where a single letter is held in front of a source of light; a strip of metal having 10 perforations in echelon is moved across the illuminated letter and the light pattern picked up by the photo-electric cell. This light pattern is converted into sound as in (1) above. Dr. Keitel states that men of low intelligence have been able to distinguish letters in two seconds. The future intention is to produce magnification of the ordinary printed word via some sort of small microscope held in the hand. Each letter picked out separately and magnified is to be converted into sound and analysed by the ear.

Instrument (1) was seen and the criticisms are as under:

- (a) The variations in pitch are not distinct enough. The P-E cell aimed at a window produced a sound which seemed to stop rather than be modified in pitch when a man walked across the source of light.



- (b) Steps or other obstructions on the ground could not be picked up.
- (c) At night the apparatus would not work at all.
- (d) The blind man's stick is much safer.

Instrument (2) in its embryonic form is large and cumbersome and can only convert into sound waves one inch letters on glass slides. The microscope pick-up to be held in the hand of the blind man is yet a somewhat misty picture in the brain of Dr. Keidel.

Dr. Keidel's report is included as an appendix.

II. EAR, NOSE AND THROATTrend in German Procedure

The general outlook upon Oto-rhino-laryngology in Germany has not latered during the last six years. Teaching is thorough, but more theoretical than practical. Patients are disciplined and are treated as clinical material first and as human beings second. Below a brief summary of procedure is given under separate headings.

Deafness

No new work has been completed regarding causation. Deafness has been a nuisance to German otologists during the war and they have been much too busy to expend much time and sympathy upon sufferers.

It was not possible to contact any military otologists, but it seems clear that the prevention of deafness resulting from gunfire and the other hazards of war was not worked out satisfactorily. Many forms of ear protection have been tried, but the advantages of intelligently used cotton wool are universally admitted. The testing of hearing has in many places been sketchy. Pure tone audiometers are not widely used; these instruments cannot be repaired in the event of a breakdown. The development of "hearing aids" for the deaf is behindhand; even the crude microtelephone type is almost impossible to obtain, whilst the valve type (as far as could be ascertained) is not manufactured.

As regards the operative treatment of otosclerosis, no otologist interviewed was undertaking the fenestration operation. The past disappoints (using the technique of Holmgren and Soudille) had created the impression that fenestration is not worth while. The later work of Lempert was treated with scepticism; this author's most recent paper had not reached Germany.

Barotrauma

This condition is well recognized, but the general opinion is that careful selection of air crew personnel and insistence on operative treatment to correct obvious nasal anatomical abnormalities has rendered the trouble a rare one. The oto-rhino-laryngologists interviewed stated that they had no knowledge of any work done on radium or deep X-ray treatment to the region of the post-nasal space and eustachian



tube. It was generally admitted that conservative treatment in the acute stage followed, if necessary, by operative treatment for correction of predisposing causes was all that is necessary.

### Therapeutic Radium Treatment

Dr. Henschke, who had worked as physician and physicist in Munich had been interested in teleradium: he had used a 1 gramme bomb and had experimented with a view to developing a 4 gramme bomb. It seems clear that in this sphere Germany is a long way behind America and the United Kingdom. Only in Munich and Berlin had serious work been planned on teleradium; in these two cities cooperation between physician and physicist was considered essential.

### Chemotherapy

No penicillin or analogous drug has been available, but full use has been made of the sulphonamide group. In the treatment of otitis media and its complications the most popular drug has been sulphathiazole, which has not however been always available. In some clinics, notably Erlangen, whatever sulphonamide had been in longest supply had been used; often cases have been started on sulphanilamide and then changed to prontosil. There was a general tendency to give uneven dosage and in some cases administration during the night was considered unnecessary. The dangers of masking the symptoms of mastoiditis and of even more serious complications were fully realized. Professor Kahler in Freiburg insisted that sulphonamides should not be exhibited in any case of otitis media in the absence of septicaemia or other complications. He argued convincingly that, though mastoid involvement was slightly less common following their use, this was offset by the danger of symptomless mastoiditis passing unnoticed. Application of sulphanilamide powder to the bone cavity after cortical mastoidectomy is popular with only a few surgeons.

### Endoscopy

Every clinic is supplied with Brünning's Endoscopy set or Kahler's modification. Jackson's instruments are condemned on the grounds that the light always becomes fouled by blood, pus or secretions. It is tempting to assume that in most cases the Jackson equipment has never been tried. Negus' tubes have not been recognized yet.



Carcinoma of the Larynx

As in other countries the treatment of this condition varies considerably with the operative dexterity and the humanity of the surgeon. Seiffert, whose operative skill is outstanding, performs total laryngectomy upon cases which most surgeons would treat by radiation: his results are undoubtedly good. In general there is a much greater tendency to fenestration of the thyroid cartilage and application of radium needles. This is probably due to the fact that tele-radiation is non-existent. The greatest diversity of opinion relates to the treatment of early carcinoma confined to one cord when there is no limitation of movement.

Richter (Erlangen) claims excellent results by biting off the growth with special punch forceps large enough to embrace healthy tissue. This is done by direct or indirect vision under local analgesia.

Höbst (Innsbruck) favours the clamp (devised by Krait) which contains a radium needle in each jaw. Under local analgesia (by direct or indirect vision) the cord is embraced by the clamp, and pins on the latter transfix the former in its healthy part. The patient, who has previously been given scopolamine and morphia, retains this instrument for the prescribed time: about five treatments are given. It is claimed that respiratory distress is not a common complaint.

Removal by Laryngo fissure is acknowledged as the best treatment by other surgeons, most of whom however have not given up treating a number of cases by radium application after cartilage fenestration.

Few surgeons have any faith in the Broder classification as a guide to treatment.

Carcinoma of Tonsil, base of tongue and epiglottis

This is most commonly treated by electro-coagulation, which is thought to give better results than radiation.

Petrositis

The surgical access described by Ramadier is the most popular, but Lempert's somewhat similar approach is not employed. At Heidelberg the method of Eagleton is still in vogue.

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Meniere's Disease

In severe cases of this disease operative treatment, either by destruction of the labyrinth or section of the vestibular nerve, is not popular. The prejudice appears to be based upon fear of meningitis.

University of HeidelbergInterview with:

Director of E.N.T. Clinic - Professor Seiffert  
Chief Assistant - Oberartz Hans Denecker  
14 July 1945

General Remarks

The self-contained clinic is housed in old buildings; the wards are not impressive, but generally speaking equipment is good. 175 beds are provided, whilst normally eight assistants are employed. Civilian work is undertaken, but special cases from the services are treated also. Professor Seiffert has an international reputation and has recently come from Kiel as director. Contrary to the usual practice, a great deal of plastic surgery of the head and neck is undertaken.

Teaching

The teaching of students has been suspended. Facilities for teaching are good though the professor has not been able to transfer his equipment and specimens from Kiel. There has been and still is, a shortage of standard text-books, whilst the publication of journals has been badly curtailed. Equipment replacement is difficult, for instance the audiometer has been unserviceable for two years.

Procedure adopted in special diseases

This is covered in another section under "Trend in German Ear, Nose and Throat Procedure"

Research. Innovations and New Apparatus etc.

Herr Denecker has developed an ingenious device which will demonstrate clotting (either mural or occlusive) in the lateral sinus without recourse to opening or needling the latter. In cases where sinus and dura of the posterior fossa are widely exposed and yet the line of demarcation is obscure, this instrument shows where dura ends and sinus begins.

The principle is simple and depends upon the speed at which the sinus wall warms up to normal temperature after artificial cooling. Blood flowing naturally through an underlying normal sinus warms up the artificially cooled wall very quickly. Rewarming time is prolonged if the flow of blood is interfered with or if the wall is made thicker by an underlying clot. The area to be tested is touched with a delicate Thermo-couple connected with a super-sensitive galvanometer; the galvanometer reading is taken. The area selected is then cooled for 15 seconds by a rubber teat filled with 5 cc of water at 20°C. and a second galvanometer reading taken. The cooling bag is removed and the time taken for the galvanometer needle to creep up to the original normal reading is noted. When the sinus is normal the rewarming process is complete in 15 to 30 seconds. If there is an underlying clot, this time period is prolonged to over 30 seconds.

A mural clot can be detected by choosing various points on the sinus wall; normal time will be noted for areas above and below the clot, whilst directly over the clot a long rewarming time is evident. As would be expected these times are modified if the flow of blood through the sinus is slowed down or stopped by jugular vein compression. Should the clot be occlusive the times will be unaltered by jugular compression. Jugular bulb thrombosis can be diagnosed with fair certainty by exposing the bulb, or in the absence of operative exposure can be assumed in occlusive cases by testing the sinus distally with and without jugular compression.

Granulations upon the sinus wall may be gently removed before making tests.

I am confident that this apparatus works satisfactorily, though I only saw it demonstrated to trace out the superficial veins of the arm.

Denecker has described his work to the Heidelberg Medical Society and expects it to be published shortly.

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University of Freiburg  
Interview with Professor Kähler,  
Director of E.N.T. Clinic  
22 July 1945

General Remarks

The university, including the E.N.T. clinic, is entirely destroyed, together with all equipment and materials required for teaching purposes. The professor is hopeful about the future and states that the firm of Fischer has sufficient reserve stocks of essential E.N.T. instruments to supply primary needs of a teaching school. There would, however, be great difficulty in collecting books, whilst anatomical and pathological specimens to meet future needs would take considerable time to prepare.

Teaching

There is no teaching now (see above).

Procedure adopted in special diseases

Oto-Rhino-Laryngology was discussed with the Professor (see section under "Trend in German Ear, Nose and Throat Procedure").

Research, Innovations, New Apparatus etc.

At the Freiburg Clinic, Dr. Oto Riecker has experimented upon guinea pigs in the decompression chamber and has found that lack of oxygen has constantly given rise to vacuolation of Deiters Cells in the cochlear. This experiment, as far as can be ascertained, has not been repeated on human beings from the concentration camps. (Original paper is included in appendix.)

Interview with Dr. U. Henschke  
Garmisch Partenkirchen  
23 July 1945

This man, originally a physician and physicist working in München, has been carrying out various experiments which are covered by reports of other members of the team. His information concerning Ray therapy is included under "Trend in German Ear, Nose and Throat Procedure".

University of Innsbruck  
Interview with  
Dr. Höbst, Director of Clinic,  
Dr. Stricker, Administrative Director  
27 July 1945

General Remarks

The E.N.T. Clinic is undamaged. Dr. Höbst has recently returned as director; he is the professor designate. There are 70 beds and usually three assistants work in the department.

Teaching

Teaching could be resumed at any time. There is a rich supply of clinical material, whilst equipment, though less impressive than at other Universities, is quite good. Here again there is a shortage of books and periodicals.

Procedure adopted in special cases

See section under "Trend in German Ear, Nose and Throat Procedure"

Research, Innovations, New Apparatus etc.

Nil.

University of Erlangen  
Interview with  
Prof. Dr. Med. H. Richter, Director of E.N.T. Clinic,  
30 July 1945

General Remarks

The self-contained clinic is very good. It comprises 81 beds for civilians and at present 68 beds for service cases. The director was superseded during the Nazi regime but is now reinstated. Six assistants are normally employed. Equipment is good, though replacements have been difficult to obtain.

Teaching

Teaching could be resumed at any time. There is ample scope for pre-graduate teaching and for post-graduate research.



### III. MEDICAL EDUCATION. INTERNAL MEDICINE AND PEDIATRICS.

#### University of Heidelberg

#### Interview with

Prof. Dr. Johann D. Achelis, Professor of Physiology and  
the History of Medicine.

#### Medical Education

Professor Achelis was Dean of the Medical School from 1942-44, having been succeeded by the Professor of Surgery, Dr. Bauer, about one semester ago. From 1939-42 he was in the Army doing hospital administrative work at Wiesbaden and commuting to Heidelberg to continue giving lectures in Physiology, the departmental staff being greatly reduced from a normal of eight assistants, although the student load had increased. He seemed frank and cooperative, although totally lacking in personal warmth and coldly intellectual in his approach. He regards the normal capacity of the school as 1200 students. This is probably correct, since each of ten semesters of the prescribed curriculum is available at each teaching session and the laboratory spaces for Physiology and for Biochemistry each accommodate 140 students. Allowing for some variation in registrations, this would mean an average registration of 120 students in each of the ten semesters of the curriculum, attrition in the earlier years being compensated for by transfers to Heidelberg for clinical studies because of its reputation as a medical center. During the war the number of students was always greater, reaching 2,000 as a maximum, and all informants volunteered opinions as to the total inadequacy of facilities for the teaching of this number. There were four Army companies of about 200 each and one Luftwaffe company.

The physical installations of the medical school were not damaged during the war and the clinical facilities were, if anything, increased by expansion for military cases. Materials and apparatus for research were available only with requisitions approved by the armed services, so that military contacts became an important feature of a teacher's position. In addition to a marked reduction in the number of medical assistants, there was difficulty in securing trained laboratory help. There was no shortage of menial labor. The German medical journals were maintained, but no current literature from outside was generally available. Three libraries in Germany were said to have maintained complete files and some medical journals were microfilmed, the films being passed from one school to another.



### Preparation of Students

The initial four years of "kinderschule" has not been changed. Prior to 1938 students entered medical school after nine additional years of schooling (through "gymnasium") and two years of military service, thus averaging 21 years of age. From 1938-40 they entered with eight years of previous schooling and after 1940 the medical schools received students several years older than 21, but of variable age, whose preparatory training had been only 7 years, and was frankly and grossly inadequate. Experience as a medical soldier, which was the rule in students assigned to the school by the Army, was of no apparent value in preparing the student and often impaired his ability to grasp the pre-clinical fundamentals.

A "small number" of students who lacked even the 7-year educational preparation was admitted for "political reasons". Some were good, some were poor, and the disposition of the poor ones was not specified. It was possible to return the poor type of Army student without difficulty, "50 to 60 per year" being so returned at the will of the faculty from any stage of the medical course. However, Prof. Achelis stated that he had continued to wear his Army uniform in teaching because the Army students then did better work. This may be an indication of the preparation and maturity of the students in preclinical courses.

### Tuition and Living Expenses

The expenses of a student vary because each course is charged separately, in addition to a semester enrollment fee. The average cost during a ten-semester course was stated to be 250 marks per semester, plus 100 marks per year for books, and 120 marks per month for living expenses in Heidelberg. No payments to the University were made by the Army, but it was stated that the Army pay of the grade of "Feldwebel" (between sergeant and officer) was adequate to allow each student to meet his own expenses. Army students were quartered together, each company being commanded by a medical officer who supervised their work. Microscopes and other necessities are furnished by the university. Books became very difficult to get after the bombing of Leipzig in 1944.

### The Medical Curriculum

At some time previous to 1939 the medical curriculum was changed from five semesters of preclinical and five of clinical subjects to four and six semesters respectively.



This shortening of the period of study before taking pre-clinical examinations was not looked on with favor by pre-clinical teachers, but it is now regarded as permanent. From 1939-42 the medical course was compressed by having three semesters each year instead of two. This was stopped as totally unsatisfactory because both the didactic periods of the lecture courses (the semester) and the interim periods of "Famulatur" when students secure their practical hospital experience were shortened. Although the formal curriculum requires only six months of this hospital work during a three-year period, when twelve months or more could be secured, and the medical school exercises no control over the type or character of hospital selected by the student, or of the amount of practical instruction received, all informants put emphasis on the importance of this time and seemed to minimize the value of lectures.

It appears that almost every student who was in the Army had his course interrupted by one or more periods of army duty as a medical soldier, often for from nine months to two years. However once an army student had completed his ten semesters work and the "Statsexamination" for medical licensure, he was allowed to remain in Heidelberg for an additional three or four months to secure the M.D. degree from the university. Asked as to the type of examinations used during the war, Prof. Achelis at first denied that they had been made less difficult, but stated that the passing grades had been lowered. Later he definitely implied that the examinations themselves had been made easier.

#### Post Graduate and Specialist Training

The Army never did anything about the training of specialists or scientists in the preclinical subjects. Until about 1943 students who were not in the Army (women and physically handicapped men) were allowed to continue with specialized studies after completion of the course. Thereafter such graduates were directed to work in civilian clinics wherever needed. However, some men who had reached assistant rank were able to return to the University for periods of six months or so between Army assignments and a considerable number of holders of the M.D. have presented work done in Army hospitals and stood the oral examination necessary for the additional degree of "Doctor of Medicine habilitatus" which qualifies a man as "Dozent". It would appear then that, even in the absence of formal arrangements, a certain number of men have been able to qualify themselves as specialists while carrying out their war assignments.

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STUDIENPLANVorklinisches Studium1. Semester (Sommer)

1. Anatomie	5	Std.
2. Physik I	3	"
3. Chemie I	4	"
4. Zoologie	3	"
5. Botanik	3	"
6. Histologie	3	"
7. Heilkräuterexkursionen im Rahmen der Botanik in kleineren Gruppen 2-3mal für den einzel- nen Studierenden	4	"
	<u>25</u>	Std.

3. Semester (Sommer)

1. Physiologie I	5	Std.
2. Embryologie	2	"
3. Bevölkerungspolitik	1	"
4. Physiolog. Chemie und Wehrchemie	5	"
5. Topographie, Anatomie	4	"
6. Histol. mikrosk. Kurs	3	"
	<u>20</u>	Std.

In den Semesterferien Fabrik-  
oder Landdienst\* 6 Wochen

2. Semester (Winter)

1. Anatomie	5	Std.
2. Physik II	3	"
3. Chemie II	4	"
4. Vererbungslehre und Rassenkunde	3	"
5. Physik. Praktikum	2	"
6. Chemisches Praktikum	3	"
7. Geschichte der Medi- zin	2	"
8. Präparierkurs	10	"
	<u>32</u>	Std.

4. Semester (Winter)

1. Physiologie II	5	Std.
2. Physiolog. Praktikum	5	"
3. Präparierkurs	10	"
4. Physiolog. Chemisches Praktikum	4	"
5. Arbeits, Sport und Wehrphysiologie (ein- schliesslich Luft- fahrt)	2	"
	<u>26</u>	Std.

Klinisches StudiumVorl. Übungen5. Semester (Sommer)

1. Chirurgische Pro- pädeutik	3	Std.
2. Medizinische Pro- pädeutik	3	"
3. Geburtshilfl. gy- näk. Propädeutik	3	"
4. Allgem. Pathologie u. Wehrpathologie	5	"

Vorl. Übungen

5. Kurs der klinis- chem Chemia	2	Std.
6. Kurs der Perkussion u. Auskultation	2	"
7. Medizinische Strahlenkunde	2	"
	<u>16</u>	"
	4	"
	<u>(20)</u>	

\* Für aktive Sanitätsoffiziersanwärter Dienst bei der  
Truppe.



Vorl. Übungen

Vorl. Übungen

6. Semester (Winter)

In den Semesterferien

1. Medizinische Klinik	5	Std
2. Chirurgische Klinik	5	"
3. Spezielle Pathologie	5	"
4. Pharmakologie	4	"
5. Bakteriolog. serol. Kurs	4	"
6. Kurs der Perkussion u. Auskultation	2	"
7. Geburtshilfl. und gynakol. Untersuchungskurs	4	"
8. Hygiene	4	"
	23	10 Std
	(33)	

1. Famulatur 3 Monate

8. Semester (Winter)

1. Geburtshilfl. gynakol. Klinik	5	Std
2. Kinderheilkunde u. Kinderfürsorge	3	"
3. Augenspiegelkurs	1	"
4. Ohrenspiegelkurs	1	"
5. Chirurgische Poliklinik	3	"
6. Pathol. histolog. Praktikum	4	"
7. Topographische Anatomie	3	"
8. Geburtshilfl. Operationkurs	2	"
9. Naturgemasse Heilmethoden mit praktischen Übungen	2	"
10. Hautklinik	3	"
11. Pathologie des Zahnes und seines Halteapparates	1	"
	20	8 Std
	(28)	

7. Semester (Sommer)

1. Medizinische Klinik (einschl. Wehrmedizin)	5	Std
2. Chirurgische Klinik (einschl. Wehrchirurgie)	5	"
3. Geburtshilfl. gynakol. Klinik	5	"
4. Hygiene unter bes. Berücksichtigung der Wehr u. Gewerbehygiene	3	"
5. Chirurgisch-klinische Visite	2	"
6. Medizinisch-klinische Visite	2	"
7. Patholog. Demonstrationkurs	3	"
8. Pharmakologie und Toxikologie (einschl. Wehrtoxikologie)	3	"
9. Impfkurs	1	"
	21	8 Std
	(29)	

9. Semester (Sommer)

1. Psychiatrische u. Nervenkl. (einschl. Wehrpsychol.)	5	Std.
2. Rezeptierkurs	2	"
3. Medizinische Poliklinik	4	"
4. Menschliche Erb- lehre als Grundlage der Rassen- hygiene	3	"
5. Naturgemasse Heilmethoden mit praktischen Übungen	2	"

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Vorl. Übungen  
14 2 Std

6. Kinderheilkunde u Kinderfürsorge	4	"
7. Sektionskurs	2	"
8. Klinik d. Hals- Nasen-Ohrenkrankh	3	"
9. Augenklinik	2	"
10. Poliklinik der Zahn-Mund-Kiefer- krankheiten	2	"
11. Berufskrankh. m. prakt. Übungen	2	"
12. Betriebsbegehungen u. besichtigungen mit betriebsarztl. Vortragen (dreimal am Ende des Semesters)		
	27	4 Std
	(31)	

In den Semesterferien

2. Famulatur 3 Monate

Vorl. Übungen

## 10. Semester (Winter)

1. Gerichtl. Medizin	3	Std.
2. Patholog. Physio- logie	2	"
3. Geburtshilfl. gyna- kol. Visite	2	"
4. Chirurg. Praktikum u. Frakturne	2	"
5. Unfallheilkunde u Begutachtung	3	"
6. Sozialversicherung u. Begutachtung	1	"
7. Poliklinik der Augenkrankh. mit praktischen Übungen	2	"
8. Poliklinik der Hals- Nasen-Ohrenkrank- heiten m. prakt. Übungen	2	"
9. Poliklinik der Hautkrankheit	3	"
10. Orthopädische Klinik	2	"
11. Rassenhygiene	2	"
12. Ärztliche Rechts u. Standeskunde	1	"
	21	4 "
	(25)	



University of Heidelberg

Interview with

Prof. Dr. Siebeck, since 1942 Director of Ludolph Krehl  
Klinik and formerly at Kaiser Wilhelm Institut, Berlin

Medical Education

According to Prof. Siebeck, the quality of medical teaching has suffered greatly during the war because of overcrowding of students, poorer premedical preparation and (with emphasis) easier examinations. He feels that his department can handle 120 students in each semester and do it well, but indicates that a teaching load of 400 students became a travesty in which many students were unable to perform even simple and brief procedures in the physical examination of patients.

His teaching responsibilities commence with the fifth or first clinical semester, when an assistant conducts a course in "clinical chemistry". All members of his department participate in the teaching of "percussion and auscultation" for four hours per week in the fifth and sixth semesters. In the sixth and seventh semesters, students attend five clinics or lectures a week on medicine, and in the latter semester there is one two-hour ward visit period each week.

Before entering the eighth semester the student must present evidence of having done three months work as a student assistant in some hospital, although the medical school has no control over the type of work elected. During the last three semesters the formal teaching of medicine is confined to the ninth, at the same time that lectures in Psychiatry and Nervous Diseases are given, and the tenth and last semester is given over almost entirely to the specialities. A second three months of hospital work must be completed before the student becomes an accredited graduate.

Prof. Siebeck's philosophy of teaching seems to favor practical work by the student, personal contact with the patient and an effort to make the student regard the patient as a human being rather than as a case of some disease. He tells students, "I myself do not know whether I am nervous because I have diarrhea, or have diarrhea because I am nervous." This is borne out by his X-ray assistant, Dr. Kommerell who, after being in Boston with Dr. Joseph Pratt, is ostensibly a great admirer of the American teaching methods. Siebeck states that, while there are probably not half a dozen internists in Germany who have his ideas, the trend of thought of many doctors is in this direction.

It was not possible to determine that Prof. Siebeck's ideas have been put into practice. Almost no interest was shown in "anamnesis", so it would appear senseless to turn a student loose to take a history on a patient. It was stated that students are encouraged to do routine clinical laboratory work on patients, but the room allocated for this work is also that in which the Professor meets his assistants at 0815 hours each morning, and in which lectures and reviews of intramural researches are presented at weekly staff meetings. Some bare laboratory desks, a sink, two gas connections, one with a Bunsen burner attached, and a hood were visible, but there was no apparatus or reagents and the desks showed none of the stains and erosions characteristic of the junior independent laboratory worker.

Communicable disease is treated in a building which is an annex to the medical clinic, but Heidelberg has separate institutes for Neurology and for Psychiatry. One of Prof Siebeck's assistants is a neurologist, so there are few informal relationships with these other departments.

Scarlet Fever. There had been an increase in the incidence of scarlet fever in this area, but the majority of the cases were of a mild nature and needed no specific treatment. Severe cases were treated by: (1) Convalescent serum; (2) Whole blood transfusion; (3) Sulfapyridine (8-10 gms daily) and experimentally by "booster" type injections of scarlet fever toxoid. When questioned as to the rationale of this latter treatment, no satisfactory explanation was made. The answer was, "it helps".

Diphtheria. It is of interest to note that active immunization against diphtheria was not practised at this institution; neither doctors, nurses, nor ward attendants had been protected. Mild cases of diphtheria were given 40,000 units of diphtheria anti-toxin administered intramuscularly; severe cases received between 60,000 and 80,000 units. Higher doses, such as 100,000 or 200,000 units were considered to be no more effective than doses of 80,000 units. As a result of untoward reactions the antitoxin was always administered intramuscularly, never intravenously. No mention of post-diphtheric complications was made.

Typhoid Fever. This has been a recent problem and there are 50 cases in the hospital, some among their own nurses who have had contact with patients. No treatments



other than adequate diet, with due allowance for the temperature level, and supportive nursing care have been attempted during recent years. Sulfonamides are of no value.

Gastric Disorders. The problem of gastritis is difficult. Prof. Siebeck believes it is a disease entity which may in some cases progress to true peptic ulcer. However, the main usefulness of the gastroscope has been in the differentiation of ulcer and carcinoma. About six cases per month are examined and the method is considered less reliable than roentgenography.

The operation of gastroenterostomy has been discontinued for the treatment of ulcer, gastric resection being preferable. Analysis of the results of gastroenterostomy showed one third to be good, one third bad in spite of continued medical treatment, and one third only barely satisfactory if medical treatment is maintained. Prof. Bauer's results from gastric resection have been so good that surgery is being advised more often, and Prof. Siebeck estimates that about 10% of soldiers with ulcer received surgical treatment and were then returned to duty in "stomach battalions".

Ulcers admitted to the hospital for pain are given soft diet, frequent feedings and belladonna, and are discharged after 2 to 3 weeks. Those admitted after an episode of hemorrhage are treated by transfusion, if the hemoglobin is appreciably reduced, and by the early resumption of frequent feedings with a somewhat more limited diet than that advised by Meulengratt. They remain in the hospital for six to eight weeks.

Acute Nephritis. Many cases have appeared among soldiers and more cases are occurring among civilians now that soldiers are returning to the community. There is a marked increase from one or two cases per year pre-war to an estimated 400-500 cases since the spring of 1942 in this clinic, and the picture has differed in that there is much edema and anuria, more and more frequent blood pressure elevation, and a smaller proportion of apparent complete recovery. Coma or convulsions appear in less than one case in twenty, but are most frequent in cases between 20 and 40 years of age.

Prof. Siebeck is non-committal as to whether this is a more severe and slightly different form of the same disease entity or a new disease. He doubts a specific etiologic agent and emphasizes environmental and war conditions as predisposing or precipitating factors.

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The treatment of Volhard is the only one worthy of consideration, there being general agreement that the best results are obtained with it. Prof. Siebeck recalls only one death in the acute stage during the past few years. The most essential part of this treatment is the complete withdrawal of food and fluids for 48 to 72 hours. This should be instituted as soon as the diagnosis is made, even if transportation is necessary. The urine output and the specific gravity of the 24-hour specimen are more important indices of renal function than urine or blood chemical findings. In cases with oliguria the specific gravity is fixed at a low level (0.008). The number and character of casts and the degree of hematuria and albuminuria are not consistent with the severity of the patient's condition and occasional cases may fail to show albuminuria although considerable edema and hypertension are present.

Usually, and always if oliguria or anuria are present, a twice daily diathermy treatment is given over the region of each kidney, 20 to 30 minutes on each side. This is generally regarded as beneficial, although no specific physiologic alteration can be observed and no experimental evidence or controlled series of cases could be given as a reference; "You must do something when a patient can't void. What do you do?"

Where edema is marked and there is considerable elevation of the blood pressure the heart is "supported" by daily strophanthin injections of approximately one-fourth milligram per 50 kg of body weight. Magnesium sulfate or a milder saline laxative is given in dosage to produce three to six watery evacuations each day.

After the initial period of hunger and thirst a severe case receives only 300-500 cc per day of salt-free fruit juices for an additional 6 to 8 days. Then if the edema has subsided and the output and specific gravity are satisfactory, the diet is increased fairly rapidly to one that approaches normal except that it is salt-free. It can be demonstrated that the addition of salt to the diet of a patient who has responded well will lower the urine output and raise the blood pressure.

Prof. Siebeck regards bed exercises as an important feature of his treatment of acute nephritis. He has four female gymnastic instructors and two masseuses working on



his wards; the former work on all long-term bed patients, especially cardinals and nephritics, before ambulant privileges are allowed. He is well pleased with the results of this whole program of treatment in returning patients to useful lives, but is pessimistic about the prospects of their ever having normal kidneys.

The criteria for cure are the return to normal weight and physical endurance, normal blood pressure, normal response to a dilution-concentration test of 1500 cc of fluid, in which the volume returned during the first few hours should be large and the final specific gravity should reach 1.025, and a normal urine. No dye or blood chemical test of renal function is used.

Epidemic hepatitis. This disease has been a cause of much disability because of its frequency and duration, but both the mortality and the chronic morbidity have been very low and little interest in new treatments or experiments on etiology has been evident. No vitamin preparations have been used except for Vitamin K and bile salts where hemorrhagic tendencies appear. Where jaundice is prolonged, 6 to 10 daily injections of corticosterone have been given with apparently favorable results.

The Treatment of Chronic Anemia. Chronic anemias which are not secondary to some other disease are classed as hypo- and hyperchromic. Iron in the "ferro" form is given in the former, seldom with hydrochloric acid even if achlorhydria is recognized. The latter is treated with Campolon (an injectable extract of liver) until the blood-iron level sinks, then with iron and hydrochloric acid and injections of Campolon every 2 to 4 weeks as necessary to maintain a normal blood picture. Neurologic symptoms and signs are rare in association with hyperchromic anemia and do not alter the treatment.

Arthritis. German medical thought distinguishes only two main forms of arthritis. Arthritis deformans, which we call hypertrophic or degenerative or osteo-arthritis, is a disease in which X-ray changes, deformity, swelling and pain occur, but in which there is no inflammation, no fever and a relatively normal sedimentation rate. Strumpel-Marie arthritis is apparently included in this group since destruction of joint cartilages, severe back pain and ankylosis are mentioned as characteristic of this first form when it involves the spine.

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In the second form endocarditis is thought to be likely to occur as a concomitant or sequel, no matter whether the picture is one of migratory and transient involvement of the larger joints without residual damage, or of prolonged involvement of large and small joints with fusiform swellings and tendencies to fibrous or bony ankylosis.

Treatment in the latter group resolves itself into that of putting all patients at bed rest to observe the effects of alternating courses of Pyramidon and Salicylates, each course lasting 8 to 10 days. When inflammation has subsided a focus hunt is conducted. Teeth are usually left alone, but most tonsils come out. Then if joint residuals are present, physiotherapy is instituted, using a medicinal mud-pack where we would use paraffin soaks, diathermy, infra-red and carefully controlled exercise. It has been found useful to give warm baths in a tank in which the instructor can join the patient and assist in carrying out exercises.

#### Visit to Wards

In a brief visit to the medical wards it appeared that the hospital had been well planned, but was crowded and far from clean. There were many flies which were extremely unpleasant in view of the story that typhoid had developed among members of the nursing staff in the adjoining, also unscreened, building. The patients themselves seemed well cared for and normally nourished, but the general aspect was cheerless and over-disciplined.

#### Interview with Dr. Burkhard Kommerell Roentgenologist, Ludolph Krehl Klinik

This man is a student of H. H. Berg and has specialized in Radiology since 1932. He spent six months at the Boston Dispensary under Dr. J. H. Pratt. After nine months' army service in Poland in 1939, he was returned to academic duties as Prof. Siebeck's assistant, first at the Kaiser Wilhelm Institute in Berlin, and since 1941 at Heidelberg. He has been particularly interested in cholecystography and feels that a new dye contrast medium, "BILISELECTAN, Schering", which came into use in 1941 is the greatest advance in X-ray technic. This material gives such good contrast that he can often secure films outlining the cystic and common bile ducts by taking views 15-20 minutes after the ingestion of



egg to produce gall bladder contraction. The dosage, given at 2000 hours in granular form is 8 gm, containing 3 gm of the drug. There is no gastric irritation or diarrhea. The material is well concentrated within 12 hours. His routine includes gall bladder, barium enema and stomach examinations in the same morning, with intravenous urography (using Uroselectan B or Perabrodil) thrown in if desired.

He has no special technics for the examination of the heart, preferring careful fluoroscopy to roentgenkymograms, but makes extensive use of laminography in examinations of the chest, skull and bones, including the localization of foreign bodies.

His equipment, which he does not regard as exceptional and which is not new, appears ultra-modern. Much of the aspect of bulkiness has been eliminated and the tubes and screens are freely movable but may be locked in any position by flipping a small lever. The fluoroscopic screen which has a pressure attachment, Buckey and cassette holder, can be adjusted so that it moves only toward the patient, maintaining whatever pressure is applied. The rotating anode tube on the laminograph machine is counterbalanced so that it moves extremely rapidly and smoothly in a 10-foot vertical arc almost at a touch.

Teaching includes four lectures per week for a semester (two of these apparently required) and for small groups of selected students practical work and "ward walks" of two hours per week, seeing cases for correlation of clinical and X-ray findings. All three members of the X-ray department assist in the teaching of physical diagnosis and Dr Kommerell is present at the daily conference held by Prof. Siebeck with his whole group of assistants.

Dr. Kommerell furnished recent reprints which have been turned over to the Secretary, CIOS (see Section VI).

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University of Heidelberg  
Interview with  
Dr. Simon, Chief of Medical Section,  
Department of Pediatrics, Children's Hospital

This hospital which is located in the city, consists of a group of two and three-storey buildings situated around a square court of flowers and trees. The grounds are well policed and the buildings in good repair. There are no wire screens for doors or windows. Capacity is 250 patients.

The hospital wards are bright, neat and clean. Individual beds and cribs are spaced well apart; bed linen was clean and all equipment was in excellent condition. On the first floor of the main building there are several small rooms retained for patients who are admitted with an undetermined diagnosis. These patients remain isolated and are not transferred to wards until the diagnosis is established. The operating theater would please even the most critical surgeon as to both equipment and appearance.

Hospital Personnel

At present Dr. A. A. Simon is chief of the medical staff and is assisted by four younger doctors who have recently been released from German military duties. The former chief of the medical staff, Prof. Dunken, was placed in a military prison one week after the city surrendered to Allied Forces. Dr. Simon is in his early forties and prior to the outbreak of war had worked at the hospital. During the war he was allowed to return to the hospital for a period of 6-8 months in every 18 months. In March 1945 he was released from military service and returned to devote his entire time to hospital duties. When interviewed he was courteous, cooperative and answered all questions in an intelligent manner. The observer received the impression that Dr. Simon had a sound knowledge of pediatrics and was well qualified to be Chief of the Medical Service.

The hospital maintains a school of nursing which has a two-year course. All candidates for this school are required to have the equivalent of a high school education before they are accepted. After graduating from the school and qualifying in state examinations, the individual is permitted to work only at the Children's Hospital as her entire training has been in pediatrics. In order to be permitted to nurse adults, a further period of training is required.



The clinical material available on the wards for teaching purposes was excellent and in variety compared most favorably with any American or British children's hospital. The patients were well cared for and in spite of the repeated statements by the staff that they did not receive enough milk and food, they appeared as healthy and well fed as one might expect of any sick child. The patients were clean, happy and obviously received excellent and adequate nursing care. Examination of the hospital records of these children showed that each child had been carefully and thoroughly studied; in fact the records left nothing to be desired.

### Supplies and Treatment

A discussion of the medical care of the patients with Dr. Simon and his assistants brought out the following facts:

Food. It was repeatedly expressed by the medical staff and nursing personnel that the food supply was inadequate. Food was rationed to the hospital patients in weekly supplies by the military government in amounts of 20 percent in excess of that allowed the civilian population. The caloric intake was admitted to be adequate, although it was felt that the amount of fats and sugar for patients between one and three years of age, and milk for the group between three and six years, was inadequate.

Vitamins. Vitamin deficiency diseases were rare in the experience of this hospital. No patients suffering from these disturbances were seen on the wards by the observer. During the war the supply of synthetic vitamins had met the demands. However, this supply had now been exhausted and Dr. Simon was appealing to the Red Cross for help.

Drugs. The supply of drugs, including the sulfonamides, was adequate. There was no penicillin on hand, nor had it ever been used in the hospital. Dr. Simon had heard of this agent through his colleagues, but had never seen it.

Diphtheria. All diphtheria antitoxin is administered intramuscularly; none intravenously. Mild cases receive between 10,000 and 20,000 units; severe cases between 40,000 and 60,000 units. In all instances the degree of severity of the infection determines the dosage and not the site of the infection. The importance of early diagnosis and prompt treatment was stressed by Dr. Simon.

Scarlet fever. It was stated that though this infection was fairly common, in the majority of instances it was so mild that only symptomatic treatment was indicated. In

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several cases particularly those with complications, large amounts of scarlet fever anti-toxin are given in conjunction with sulfonamide therapy.

Pertussis. Patients suffering from this infection and seen early in the course of the disease (first two weeks) were given pertussis vaccine. Three injections were given at two day intervals. The dose of the first injection was 0.5 cc and each subsequent injection was increased by that amount. Convalescent pertussis serum had never been employed and as no clinical improvement had been noted following whole blood transfusions, it was the belief of the staff that such therapy had no value.

Acute Poliomyelitis. When these patients were admitted to hospital during the pre-paralytic stage they received large doses of convalescent poliomyelitis serum intravenously. It was the opinion of the staff that excellent results had been obtained by this therapy. Patients suffering from respiratory paralysis were given oxygen and respiratory stimulants as indicated. The hospital did not possess a mechanical respirator, but one was available at the hospital for adults. The use of this respirator involved transferring the patient from one hospital to another and not infrequently the patient died en route. Dr. Simon stated that there was a severe epidemic of the infection in Cologne and Munich during the summer of 1938. The mortality rate was high because of the large number of patients suffering from respiratory paralysis. This epidemic has been described in a book by Dr. Hans Klunischmidt, *Die Übertragbare, Kinderlähmung*, 1938. The book was published in 1939 by Verlag von S. Hirzel, Leipzig.

Ophthalmia Neonatorum. Only occasional cases were seen. These quickly responded to sulfonamide therapy.

Meningitis. All types of meningitis were treated by sulfonamides. Patients with meningococcus meningitis were given sulfathiazole, anti-meningococcus serum being employed only in those instances which failed to respond satisfactorily to sulfathiazole. Sulfadiazine was administered in cases of streptococcus meningitis, while sulfapyridine was the agent of choice for pneumococcus and influenza meningitis. No satisfactory treatment had been found for tuberculous meningitis. The method of treatment was to give large doses of the agent for the first two days and then to give small amounts for the following three or four days, depending on the patient's response. Dosage varied according to the age and weight of the patient. It is of interest to note that blood level determinations were never made, nor were they made in any hospital visited by the investigating team.

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Erysipelas. Excellent results had been obtained by the administration of prontosil and this had been accepted as the standard form of treatment for the hospital.

Tetanus. Tetanus anti-toxin is injected intramuscularly about the site of the lesion in amounts varying from 100,000 to 200,000 units. This amount may be repeated at daily intervals if the patient is not showing improvement. No anti-toxin is given intraspinaly. In critically ill patients the first intramuscular injection is often accompanied by an intravenous injection of antitoxin. Avertin is employed freely for narcosis.

Acute Nephritis. This disorder has been rarely seen in patients under three years of age. Treatment has been by salt-free diet, restriction of fluid intake and bed rest. In cases with anuria diathermy treatments are given over the lower lumbar area as it is thought to stimulate voiding. Magnesium sulfate is not used to control blood pressure.

Nephrosis. Rarely seen, although at the time of the observer's visit there were three cases on the wards. Treatment of these patients is in accord with that employed by American and British hospitals and just about as successful.

Tuberculosis. There has been a large increase in pulmonary tuberculosis among children. A similar increase has appeared among the adult civilian population and it is thought that this has been the source of infection for the children. Bone tuberculosis, as well as glandular tuberculosis, is extremely rare. The incidence of tuberculous meningitis among young infants is rapidly rising. Treatment of pulmonary infections has been along orthodox lines with rest, sunshine, high caloric diet and high vitamin intake. Small transfusions of whole blood are thought to benefit the patients suffering from pulmonary infection and are given at 4 to 6 week intervals.

Metabolic Disorders. A discussion of several of these conditions with Dr. Simon revealed that the treatment employed was essentially that of American and British institutions.

Leukemia. Repeated blood transfusions and X-ray therapy were being unsuccessfully employed.

Erythroblastosis Foetalis. The occurrence of this disturbance of the new-born was stated to be very rare. The importance of the Rh blood factor was said to have been known to the staff at the beginning of the war, but since then research work on this subject had not been carried out and recent advances in America and England were unknown.

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Pneumonia. Sulfonamide therapy was employed in practically all cases. The opinion was expressed that the mortality rate was reduced, but the incidence of complications had not been altered. There were 10-12 cases of empyema on the wards at the time of the visit. Penicillin had not been available for these.

Acute Rheumatic Fever. Only about six to eight patients a year were seen at the hospital, so this disease was considered to offer no problem, although the staff did state that cardiac complications were common. During the acute stage treatment consisted of one short course of sulfapyridine (dose 1 gram per year of age) for 4-5 days, followed by 2-3 grams of sodium salicylate or pyramedon daily, as long as there was any febrile reaction or painful joints. Tonsillotomies and adenoidectomies were performed in 90% of the cases. No evidence was offered as to the benefits derived from this procedure. Treatment for those patients who developed cardiac involvement was along accepted lines with bed rest, diet and exercise based on the sedimentation rate.

Acute Nutritional Disturbances. During the past 2-3 months there has been a tremendous increase in these disturbances. The onset is acute and the clinical course stormy with much vomiting and diarrhea. Febrile reactions are definite, but not marked; the baby very rapidly develops a severe degree of dehydration and is often admitted to the hospital in extremis. Treatment has consisted of multiple small blood transfusions, intravenous hypertonic glucose and the subcutaneous administration of normal saline solution. Amino acids have not been employed and practically nothing was known of their use. The cause of this sudden increase was attributed to lack of an adequate supply of milk.

Burns. Local application of Marfanil followed by "Tannin" (tannic acid preparation) formed the basis for the treatment of all burns. Supportive measures consisted of blood transfusions, hypertonic glucose and the administration of normal saline.

Blood Transfusions. No blood substitutes had been employed by the hospital as an adequate supply was always available. The hospital did not maintain a blood bank, but kept a list of donors who could always be obtained.

Sulfonamide reactions. There had been relatively few reactions. That causing chief concern had been leukopenia, but the staff felt that this had been successfully met by multiple blood transfusions.



University of Tübingen  
Interview with  
Prof. Dr. Stock, Dean of Medical Faculty  
and Professor of Ophthalmology  
20 July 1945

Professor Stock had held the chair for diseases of the eye for many years. He was rector of the university until the Nazi rise to power, but refused to join the party and was removed from all administrative authority until three days ago when he became medical dean.

Teaching Facilities

Tübingen was a German "hospital town" and it appears that every building of any size was converted into a hospital, including some of the university class-rooms and laboratories. Also a very large Lazarett or military hospital was built on one of the hills overlooking the town. The clinical teachers had consultant responsibilities in connection with these hospitals and cases requiring special studies or operative therapy were often transferred to military wards in the special clinic buildings. Army patients were not used in teaching. The university's normal complement of beds for use in teaching is 2,500 and extensive out-patient facilities are also available. Patients normally come in from a very large rural area and the shortage of doctors in the smaller surrounding communities due to the demands of the army resulted in a sharp increase in the patient load which persisted until the trains stopped running. For example the number of visits to the Eye Clinic rose from an average of 13,000 per year to 27,000 per year during the war.

Teachers, Clinical Research and Specialist Training

All the clinics lost most of their experienced personnel below the professorship level and suffered from a sharp reduction in the number of assistants. This, together with an increase in the number of students, affected the quality of teaching, made the staff too busy to carry out any appreciable amount of clinical research and even made it impossible to assign subjects to some of the students who would have been able to present a thesis for the M.D. degree if they could have received more personal attention.

Since the selection of assistants depended upon the sex and physical infirmities (Prof. Stock added "mental" with a twinkle in his eye) rather than aptitude, it is felt that the quality of specialists as well as the number trained has been seriously affected and that the future supply of competent teachers is very limited.

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Number of students, Tuition costs

The normal number of registrations in the whole medical school was about 600 per semester before the war. This rose very considerably to a maximum of 1700 students in one semester due largely to the fact that the Army, the Navy and the Luftwaffe all sent companies of students to the school.

Normally the expenses of a student were 250-300 marks per semester for tuition, plus about 120 marks per month for living and books. However, a large percentage of students received the equivalent of scholarships in the form of stipends from the state. The Armed Forces paid the university nothing and their students were quartered and fed in military barracks.

Curriculum, Quality of Work, Examinations

No changes in the medical curriculum were made until 1944 except for the two-year (1940-42) attempt to have three semesters a year, which failed because it gave students inadequate time to assimilate the material presented. Ten semesters were required for the qualifying examination and eleven for the M.D. degree, until 1944 when some men were released after nine semesters. The faculty feels that this was almost disgraceful and each such student is now being contacted and urged to return and complete his course.

The quality of students entering the medical course had fallen before 1939 because of a reduction in the required preliminary education, and it deteriorated further because of another reduction during the war. This lack of fundamental training was felt by instructors throughout the medical course although it was emphasized that the good student was finally able to compensate. The living arrangements of students from the armed forces were ill-adapted to study or to the development of the proper attitude, and the interruption of studies by periods of active service as a sanitary non-commissioned officer was invariably detrimental.

As Chairman of the Examination Board, Prof Stock assumed a dual capacity and became an officer of the state. He thought that the examination questions had been made easier and were graded more leniently after 1942. When a man failed his examination he was allowed two more trials. In practice he usually passed on the second attempt, even if he did no better, because the faculty felt sure that he would be assigned to medical work in the army and was tired of having him around.



Prof. Stock emphasized, however, that the quality of work done by the highest 10-15% of the students was fully up to pre-war standards and that the chief educational defect was their inability to pursue medical studies after graduation in order to become the specialists and teachers who will be needed in the future.

University of Tübingen  
Interview with Prof. Dr. Herman Benhold  
Director of Medizinische Klinik and Poliklinik  
20 July, 1945

This man, after preliminary training at Berlin and Hamburg, had been Oberarzt in Internal Medicine at Bonn until 1942, when he assumed his present duties. His research thesis has been that the blood serum proteins function as an "organ" (in the same sense that red blood cells do) in the transport through the body of some electrolytes and many more complicated organic components of enzyme systems, adsorbing them at one place, releasing them where needed. No practical applications of this theory became apparent in the course of the interview. It did seem that his work and his clinic had been less disturbed by the war than any other visited, and that he had complete control of a going concern.

Teaching Facilities and Responsibilities

The department teaches about 300 students per semester, including those studying clinical microscopy, which is taught by an assistant professor. Clinical teaching and lectures are given to students in their 6th, 7th and 9th semesters. There are 450 teaching beds under his direction and he is able to handle 50 students for "Famulatur" work between semesters. There is a separate Psychiatric Clinic, with a title which includes Neurology, but in practice neurologic cases are handled in the medical clinic under the direction of a specialized assistant. The Oberarzt in charge of his X-ray department is the only qualified radiologist in the university, and all the more complicated procedures are done there, although there is a separate department in the Surgical clinic. It is his plan to have each of his younger assistants spend a six months rotation period in the X-ray department, but this has not been feasible during the war.

The Use of Sulfonamides

Prof. Benhold was the only doctor interviewed who appeared to have made a serious attempt at independent evalu-



ation of the sulfonamides. Except where the patient's condition requires immediate treatment, an effort is made to prescribe the drug best adapted to the control of the etiologic agent and to pay somewhat less attention to predetermined rules of duration of treatment. However, blood sulfonamide levels are not done routinely and it appears that the criteria for optimal clinical response are low because of hesitance in using these drugs.

The complications of sulfonamide therapy are stated to be negligible and to require no treatment save omission of the drug. Skin rashes are more common with Cibazol (sulfathiazole) than with Globucid (an ethyl sulfonamide compound made by Schering which appears to have no common American counterpart). The latter is also preferred to Dagenan (sulfapyridine) because of its effectiveness against the pneumococcus with complete absence of gastric irritation. Agranulocytosis and hemolytic anemias have been heard of but not seen. No minor psychoses have been recognized.

Sodium bicarbonate is given with "large doses" of sulfonamides, apparently as a carry-over from its use with sulfanilamide, because microscopic hematuria is regarded casually, gross hematuria is very rare, and no attempt is made to alkalinize the urine, maintain any particular level of urine output, or even routinely record the fluid intake. Crystallization in the acetyl form is recognized only as a disadvantage to the use of acetyl-sulfonamide, not as a urologic problem. Pyrimal (sulfadiazine) had been used in Tübingen only because Prof. Benhold received a supply for clinical trial. He gave it to a small series of pneumonia patients and was not impressed with any advantage over Globucid, so did not request a further supply. No drugs like sulfaguanidine or sulfasuccidine had been available, and Cibazol was the drug of choice for acute intestinal infections.

### Treatment

**Pneumonia.** The results of sulfonamide treatment of pneumonia of the lobar type are very good, those in the "lobular" type not so satisfactory, although the mortality is greatly reduced. In reply to a direct question Prof. Benhold said, "There is a form of pneumonia found by X-ray after an attack of influenza which does not respond to sulfonamides. The patients are not as sick as the amount of involvement would suggest and do surprisingly well on supportive treatment." Prof. Benhold does not know how long these cases have been appearing, but he has been interested for about five months and has recently assigned



an assistant the problem of combing out and studying these cases. He thinks he may have seen about 50 of them. It is believed that he was describing Primary Atypical Pneumonia (see Erlangen, Maythaler).

Diphtheria. Moderately severe cases of diphtheria receive 10,000 to 20,000 units of diphtheria anti-toxin intramuscularly, while severe cases are given between 60,000 and 70,000 units; only occasionally is as much as 100,000 units given. In these severe cases the anti-toxin is given both intravenously and intramuscularly, the initial injection being intravenously. It is of interest to note that instead of giving all of the anti-toxin at once, it is given in doses of 20,000 units each day until a total of 60,000 units has been injected. In those instances of diphtheria with marked swelling of the cervical nodes, sulfonamides are given in conjunction with diphtheria anti-toxin. Dr. Benhold stated that there is a high incidence of post-diphtheric paralysis and myocarditis. The former complication is treated by artificial fever (Pyripher, see Typhoid) and most successful results are reported. Myocardial complications are treated by bed rest and if necessary strophanthin 1/8 to 1/4 mgm once or twice daily. Post-diphtheric myocarditis is the only heart condition in which the use of dextrose intravenously with strophanthin is favored.

Scarlet Fever. Blood transfusions from a convalescent donor have practically entirely replaced scarlet fever anti-toxin in the treatment of this disease. Mild cases are not considered as requiring any specific therapy and usually do very well with just routine hospital care. Sulfonamides are given only in those instances in which complications occur.

Meningitis. Meningococcus meningitis is treated by "great doses" of sulfathiazole and only rarely with serum. Twelve grams daily are given during the first three days and then the dose is decreased without reference to the adequacy of the effect. The initial dose of 3 to 5 gm is given intravenously and the remainder per os. Pneumococcal, influenzal and streptococcal meningitis are treated in the same manner as meningococcus meningitis, but the results have been most discouraging as few patients have recovered.

Tabes Dorsalis and late Syphilis. These cases are treated in the medical clinic unless clinical paresis is present. They are no longer common, perhaps six cases a year coming under treatment, four or five of which will show

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an aortitis. At first only bismuth salicylate is given intramuscularly twice weekly. After three or four weeks neosalvarsan 0.075 gm is given intravenously. The next dose, 4 or 5 days later, is 0.15 gm and the dose is then stepped up gradually to a usual maximum of 0.3 gm, rarely 0.45 gm, and never 0.6 gm. This treatment is continued until the patient has received 5 gm of neosalvarsan and 20 grams of the bismuth salt. Then malaria treatment is instituted, giving prophylactic strophantin if an aortitis is present. The results of this treatment are regarded as good, but adequate follow-up analyses had not been made. Iodides are used only as a preliminary treatment in syphilis of the liver when one hesitates to burden the affected organ with heavy metals. Then the patient receives intravenous injections of 10 cc of 10% sodium iodide on alternate days for 3 or 4 weeks before bismuth is used.

Stomach Disorders. A gastroscope is available in the Klinik and has been used at times by assistants interested in doing surveys, but its use in actual diagnostic study is limited to about six cases per month. There is no interest in the problems of gastritis versus functional stomach disorders and the treatment of peptic ulcer is frequent feedings, belladonna, alkalies and bed rest, after preliminary strava-tion if bleeding has occurred. Amphoteric antacids have not been used.

Tetanus. This disease is normally treated in the surgical clinic and Dr. Benhold is not familiar with their methods, but two recent "chronic" cases having risus sardon-icus and marked muscular stiffness have been treated on medical wards. Antitoxin was not given. Treatments, depending on the need for sedation, are rectal barbiturates, evipan intravenously drop by drop for many hours, and Dolanthin (an I.G. Farben pyridine compound with effects similar to morphine, including its habit-forming features, possibly similar to Dilaudid).

Typhoid Fever. Based on the opinion of his preceptor in Hamburg 12 to 15 years ago, Prof. Benhold routinely uses transfusion from recovered patients in the treatment of severe typhoid infections. Also his Oberarzt has been able to show that the fastigium, or period of continued fever about the third week of the disease, can be shortened appreciably by the judicious administration of a non-specific fever-producing preparation called Pyrifer. This is prepared by a small laboratory in Freiburg and is thought to be derived from bacteria of the colon group. The same material



has been used in post-diphtheric peripheral neuritis with excellent results, but the treatment appears to be harmful in peripheral neuropathy associated with "encephalomyelitis" (probably referring to the disease called "infectious polyneuritis" by Muller in Erlangen).

Typhus Fever. This has not been at all common in the Tübingen area. Immune transfusion is used. No chemotherapy has been attempted.

Acute Nephritis. Prof. Benhold believes that "war nephritis" is a different disease because it has been seen with great frequency in some units and groups of soldiers, while other units in comparable circumstances have been free of it, and because he regards the prognosis for ultimate recovery as better. He does not feel that the individual case can be distinguished clinically from other forms of acute nephritis, but an onset with grossly bloody urine, coma or convulsions has not been noted in the group "epidemics". He is inclined to suspect a particular group of organisms, plus a particular combination of environmental circumstances as combined etiologic factors. Hypertension and edema are present in a large majority of cases, nitrogen retention only in a minority, but deaths occur only in those with severe nitrogen retention (200 to 400 mg. per cent, often without coma). He is convinced of the importance of hunger and thirst for two or three days in the treatment of all types of acute nephritis, and gives strophantin 1/8 to 1/4 mg. once or twice daily to support the heart when edema or hypertension is present. After the initial period he gives only fruit juices up to three fourths of the urine output of the previous 24 hours until all edema has subsided. Daily diathermy treatments over both sides of the lumbar area are given. Subacute nephritis cases are treated by removal of foci, although he thinks these foci seldom have a direct bearing on the cause of the disease.

Hepatitis Contagiosa. This has been the most common disease of the war in both army and civilian populations and has assumed as serious a role in producing disability as influenza did after the last war. Many thousands of cases have been seen, with only occasional deaths in the picture of acute yellow atrophy, and not over 1% of cases showing residual liver disease. No method has been found to prevent these events. Vitamin E has been tried in the Tübingen Clinic without benefit. A low fat, low protein diet is given. Several cases of coexistent hepatitis and nephritis have been seen and Dr. Benhold has wondered if there were

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some etiologic relationship. Weil's disease seems not to have been considered very seriously in these cases and no recent epidemics of it are known.

Ascariasis. Tübingen is noted in Germany for a high incidence of ascariasis and much intestinal symptomatology which comes to the clinic is relieved by oil of chenopodium. The pathology department contains many interesting specimens of ascarid involvement of the liver and biliary ducts and intestinal obstruction from balls of roundworms is not uncommon. Asked if he felt that ascariasis produced any allergic manifestations, he mentioned urticaria as sometimes being clearly related to infestation and stated that he was also looking for relationships to hay fever and asthma, but had found nothing conclusive.

### Blood Substitutes

There had been no need for blood substitutes or a blood bank in Tübingen because plenty of donors were always available when extra food tickets were given. There is more difficulty since that system has been stopped by the Military Government. No attempts to supply nitrogen parenterally in other ways than by transfusion had been made. Whipple's work showing that plasma proteins furnish food being cited.

### Hospital visit

During an afternoon spent visiting the wards many cases were seen. One separate pavilion for women was in immaculate condition and the ward was cheerful and decorated with flowers. Patients were doing various types of fancy work and seemed alert and responsive. Two cases of Addison's disease with very marked skin pigmentation were seen: the first, a 15-year old girl, had had a double implantation of corticosterone just above the axillary tail of the breasts five days before. Her extra medication of salt had been stopped. The second, a woman of 60, had returned to the hospital for a second implantation, having resumed active work during the 13-month interim. Other cases were of Hodgkin's disease and leukemia under treatment with roentgen rays; severe rheumatic myocarditis being treated by bed rest, 1/2 mgm of strophantin on about 2 out of 3 days, and 3 gm of pyramidon per day; and glomerular nephritis under treatment as discussed above. A case of pulmonary and cutaneous sarcoidosis gave a history of bilateral iritis two years before which had not been recorded until the question was asked on rounds.



The male wards in another, older building were not so well kept and were more crowded. A case of "pseudo-sprue" was shown in which the weight loss had been 20 kg and the response to Campolon (parenteral liver extract) had been good, but the sugar tolerance test had shown a swing of 45 mg per cent and the stools had not been characteristic. The percentage of fat in the stools had not been determined. A case shown as a primary cerebellar degeneration suggested posterior column disease, but since the blood count was normal, and in spite of a history of glossitis, no gastric analysis had been done.

A case of diabetes was shown in which the weight loss was half the body weight, 40 kg. On admission the blood sugar was over 600 mg percent, but no acetone was demonstrable. Prof. Benhold's definite but rather surprising explanation was that the tremendous loss of body fat left none to be metabolized so as to form acetone bodies.

There was one case of liver enlargement and ascites which had been intermittent since "hepatitis contagiosa" ten months before. Several cases of jaundice were seen. A patient with brain tumor had had a diagnostic cerebral arteriogram, but the films were not available for review.

A typical case of very severe rheumatoid arthritis of 15 months duration in a German Navy medical officer was shown. The crippling was extreme because of fusiform swellings and contractures with lateral deviation of the fingers and wrists and fibrous partial ankylosis of the elbows, shoulders, hips and knees. A severe unilateral iritis was present. The patient was extremely emaciated and the feet, which had been constantly dependent with relation to the legs and thighs because of knee contracture, were swollen to the size of footballs. In the absence of cardiac murmurs other than a systolic murmur over the pulmonic area, and with normal blood pressure and heart size, this was demonstrated as an instance of "rheumatic" cardiac involvement.

The hospital has two rooms within rooms which can be maintained free of dust for patients with severe allergy. It had been noted that some patients became comfortable as soon as they were put in the room and the fan was started, but before the doors were closed. The reaction of Prof. Benhold's assistant to this series of events was one of complete disrespect for the patient, although it appeared that the rooms are not used except when a physician regards the symptoms as severe enough to require special measures for relief.

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Brain Research Institute  
Eisenbach, near Neustadt, Black Forest.  
Interview with  
Prof. Dr. O. Vogt and Prof. Frau C. Vogt  
22 July 1945

The above institution was visited as a target of opportunity. The building is modern in every manner and equipped with laboratory facilities for animal experimentation. Both Prof. Vogt and his wife are recognized authorities on pathological changes within the central nervous system. On leaving Berlin in 1935 they were able to bring a small number of their staff with them, but the number was entirely inadequate to perform the amount of work usually undertaken by the director. Professors O. and C. Vogt had over one million microscopic sections of brain tissue, but when they were forced to leave Berlin only about 350,000 slides could be taken with them.

Prof. Vogt's work on the specialization and localization of brain function is well known. During our interview we had the pleasure of hearing a discussion of his earlier work on the localization of function in the monkey's brain and how it compared with the work by O. Foerster on the human brain.

Research work performed at this institution is not along the lines of military medicine. It is of a highly technical and profound nature.

Interview with Prof. Dr. Hubert Messner  
(same Institute)  
21 July 1945

The Brain Research Institute was built in 1936 and is directed by Prof. Dr. O. Vogt. The latter was formerly the director of the neurological section of the Kaiser Wilhelm Institute, Berlin, but due to his anti-Nazi opinions he was removed in 1935. Prof. Dr. Messner is in his early forties, married and has one son. They live in a small farmhouse called Wiesbacherhof located about ten miles from the Institute. Prof. Messner, who had been consulting pathologist for the German Army and Navy, had devoted most of his time to the study of the pathological effects of carbon monoxide. The following paragraphs reflect his views as expressed at the time of the interview.



Liver Necrosis due to CO

Numerous microscopic sections were demonstrated. These showed a gradual change from early edema, increased cellular staining and pyknosis to actual cellular necrosis. The type of staining and cellular change observed was stated by the professor to occur in no other type of liver disorder.

When the liver tissue is stained with hemotoxylin methylene blue, the protoplasm assumes a most unusual blue appearance, which is thought to be due to the staining of the mitochondria. Such changes occur following the exposure of animals for 48 hours to a 16% CO concentration. There is also marked pyknosis of the nucleus. Cellular necrosis first appears about the central vein of the lobule and spreads peripherally. Prof. Messner believes that necrosis is directly related to loss of tissue potassium and he has been able to demonstrate a loss of potassium in all animal tissues. Associated with the loss in the tissues, there is an increase of potassium in the urine. As a result of these observations, he feels that the oral administration of potassium is indicated in carbon monoxide poisoning in man. Dosage, frequency of administration etc, had not been determined.

Renal Changes due to CO

Prof. Messner stated that children suffering from dehydration developed an alkalosis, thus freeing calcium which, on passing through the kidneys, produced calcium nephrosis. In CO poisoning in adults, calcium was released and a similar clinical and pathological state was produced. When microscopic sections were examined, black staining areas due to calcium deposits were pointed out. These changes are only observed after death of the kidney cells and appear in the excretory section of the renal tubules. It was stated that the intravenous injection of sodium chloride should be effective as a therapeutic measure. However, the experimental work along these lines was incomplete and actual trials had not been made.

Pulmonary Changes due to CO

Following the inhalation of carbon monoxide there is the immediate formation of a layer of fibrinoid material inside the wall of the alveolus. Adjacent to this there is a thin layer of edema fluid. Prof. Messner compared the pathological changes to those seen following exposure to phosgene. Later changes show a leucocytic infiltration

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about the alveolar duct and this introduces the period of necrosis. When stained by hemotoxylin these changes appear as black thickened areas in the wall of the alveolus. The final microscopic picture demonstrates the alveolus filled with edema fluid and leucocytes, a picture not unlike that seen in pneumonia.

#### Changes in Blood Vessels due to CO

Prof. Messner had studied the blood vessels of the lungs only. These vessels showed a marked increase in their permeability which permitted edema of the wall and adjacent tissues (here again the similarity to the changes seen in phosgene poisoning was mentioned). Three stages of changes occur: at first there is edema of the vessel wall; secondly a layer of fibronoid material is deposited on the outer wall, and finally there is an infiltration of leucocytes and resulting necrosis.

#### Changes in Brain due to CO

Animal studies have been made which demonstrated that the earliest changes consist of a loss or destruction of Nissl substance, shrinking of the nucleus and increased staining of the nucleolus. The changes are then followed by death of the nerve cell and loss of cell borders. In some instances crystal-like deposits have been noted in the nerve cells. The significance of these deposits is not known. Loss of heterochromatin in the nuclei of the small nerve cells adjacent to Purkinje cells had also been observed. This signifies that the cell is exhausted and death of the cell usually follows.

#### Effect of CO on other Organs

No changes of significance have been observed in the heart, bones or intestines of animals.



University of Freiburg  
Interview with  
Prof. Dr. Franz Buchner, Professor of Pathology  
21 July 1945

This man was tremendously busy with an active pathology service and the directorship of a special institute for the Luftwaffe until the night of 27 Nov 1944 when, while he was on a street-car going home from the laboratory, a 20-minute bombing raid by the RAF eliminated the center of Freiburg, including all the teaching facilities of the medical school. Since then he has done some private consultation laboratory work at his home in the suburbs, and gives makeshift classes for medical students in bomb shelters and the like.

The normal pre-war complement of medical students in Freiburg was 1500, and the Department of Pathology taught 200 students per semester and gave practical work to 150 of these. During the war these figures rose from 2000 total students, 650 taking some pathology, 250 doing some practical work. Before the war Prof. Buchner had four assistants and six to ten volunteer assistants. During the war he was allowed one assistant and secured voluntary help from senior students and members of the Luftwaffe Institute. The normal year averaged 600 autopsies in his laboratory, while in 1944 there were over 800.

In attempting to recover his books and specimens from the ruins of his institute, Prof. Buchner was injured in the chest and required 5 months hospitalization. He is now fully recovered and able to report that his microscopic teaching collections and 50% of his gross material can be utilized for teaching.

Prof. Buchner tactfully referred all questions as to the quality of medical students and the teaching methods to the dean, Prof. Beringer, and had nothing to offer as new in the way of pathologic investigations having practical clinical bearing. He seemed rather "stale" and relaxed by comparison with other German professors, but had or has gained the confidence of the French Military Government and will probably progress to a status of great influence in the medical school.

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University of Freiburg  
Interviews with  
Prof. Kurt Beringer, Professor of Psychiatry  
and present Dean of Medical School,  
Prof. Dr. Kurt Ziegler, Professor of Medicine,  
and Dr. Richard Jung, Oberarzt in Psychiatry.

These men were interviewed in a group so as to secure a general idea of the situation in Freiburg. It appears that the clinical departments of the Medical School functioned regularly and quite normally in spite of many changes in lower staff membership until the bombing of the city on 27th November 1944. After that all teaching was chaotic, mostly conducted in basements and air raid shelters. No serious effort to organize teaching in any of the hospitals remaining in the periphery of the city was made.

Teaching of Neurology and Psychiatry

Although there were separate institutes in these subjects, each with its own staff, Prof. Beringer heads both units. Assistants often alternated between units in the course of their training. Teaching consists mainly of five hours of lectures and clinics per week for two semesters. During the second of these semesters there is some integration with the clinics on general medicine given by Prof. Ziegler. There is a one-hour period each week when students examine psychiatric and neurologic patients and another hour per week of "medical psychology", both elective courses. Clinical material increased very greatly during the years before the war as the reputation of Prof. Beringer's clinic increased, but there was no increase during the war.

Neurologic Problems

Dr. Jung has been able to continue electroencephalographic studies, but they have been clinical rather than experimental. Diagnostic records were made for the armed forces, but there was no use of the test in selection processes. The work of the laboratories of the psychiatric department increased because of the wider use of diagnostic lumbar puncture and of electroencephalography and special X-ray studies of the nervous system. This fact is consistent with the idea that the Germans attempted to classify many functional disturbances in organic categories. The Freiburg clinics had no notable increase in neuropsychiatric cases after bombing episodes. This may be largely explained by the fact that many people fled to the country and received what medical attention they got in rural areas. Occasional



cases which have been hospitalized for months in other towns are still filtering back to the city. These cases are treated by small doses of luminal and suggestion. Insulin and deep narcosurgery have not been used, nor has prefrontal lobotomy been done, but electric shock therapy has been used with good results in severe anxiety states with tremors, as well as in schizophrenia.

### Multiple Sclerosis

This is the most common neurologic disease in this area. There has been no particular increase in its incidence. The treatment is the administration of neosilvorsalvarsan 0.12 gm twice weekly until a total of 2 gm has been given. Results are good but not striking. No new ideas as to etiology have been brought forward.

### Medical Problems

Prof. Ziegler, who appeared old and tired although he had just returned from a trip to Switzerland, seemed to be unable to do more than give his general impressions. There had been no marked increase in nephritis in his practice. He thinks war nephritis is simply the result of lowered resistance because of exposure to cold and a combination of physical fatigue and psychic exhaustion. Rheumatism has increased in the past year and he has seen many cases which follow an attack of dysentery. Perhaps this may be due to a change in the intestinal flora. He had noted that while diabetic cases did very well under the food supply conditions of 1914-1918, they have been in constant difficulty during this war. He attributes this to the psychologic factor of constant nervous tension from fear of bombing.

Many patients complain of defects in memory. Prof. Ziegler attributes this to shortage of fats and the fat soluble vitamins. In addition he sees a complex and multiform disturbance, which has apparently confused him a great deal, and which he identifies with the thyroid dyscrasias because of the basal metabolic rates of plus 20 to 30 percent. As he describes them, these patients show much free-floating anxiety and distractibility, a tendency to hypochondriac ideas, fine tremors, sweating, palpitation, various mild gastric complaints, and sometimes pseudo-angina pectoris. Studies are of interest in that in association with elevated metabolic rates, there is a definite hypotension and a tendency to bradycardia at rest. These people often have overt clinical tetany without any indication of hyperventilation and with normal blood calcium values. His treatment

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has consisted of rest, graduated exercise, sympatone (sympathin) and a drug which he says is thyroxine in which the iodine has been replaced by fluorine. Results have not been striking and he is inclined to attribute the condition to nutritional factors with an emphasis on shortage of red meat (see Erlanger, Maythaler).

There has been no increase in true exophthalmic goitre and practically no surgery has been done for this condition because patients will not enter hospitals for elective operations on account of fear of bombs. Emergency surgical cases are cared for in basements for three to six days after operation, but these facilities are limited and in hospital wards patients must get themselves to shelters or remain where they are.

Sportshospital, Garmisch-Partenkirchen  
Interview with  
Dr. Berling, formerly Chief Medical Officer.

Garmisch-Partenkirchen contained the headquarters of a German army hospital group which consisted of 24 different hospitals with a total bed capacity of 20,000. These hospitals were specialized in various ways and to varying extents, one being designated as a rehabilitation hospital for surgical and orthopedic cases, especially amputees. This Sports-hospital was housed in what had been an hotel, with four to six patients to a room. Although an effort was made to secure early transfer of cases having amputations and wounds of the joints, only about 5% of the 450 patients required complete bed-care, most of these because of intercurrent respiratory infections or recurrence of inflammation at the wound site. The remainder were able to go to meals and to the toilet, often with assistance, and to participate in the sports program. Two gymnasiums were available as well as many rowing machines and outdoor facilities. Facilities for surgery were available, but apparently only minor secondary procedures such as incision and drainage were carried out, all plastic, major orthopedic and nerve suture cases being transferred to other units for this work, often to return for further rehabilitation.

The approach to each case was twofold: first to maintain and improve strength and motion in the affected area, and second to improve general strength and prevent the effects of inactivity. In practice, however, the two were combined and each patient of whom ambulant activity was required was

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assigned to one of 17 separate groups, depending more on what surgical condition was present than on the level of general activity of which he was capable. This assignment usually occurred only after two or three weeks in the hospital, during which time the effects of supervised active motion of the injured part and general bed exercises, under the direction of a woman gymnastic instructor who visited the patient daily, were observed carefully for signs of inflammation. This activity was usually instituted before the wound had closed and often while a "benign" drainage was present, even from a secondary amputation incision. Drainage was benign in the absence of fever, appreciable elevation of the sedimentation rate and tender or warm induration, and often persisted for many weeks while the patient was quite active. The surgeons were, however, very conservative about undertaking any secondary procedure for six weeks or more after all evidence of an active process had disappeared.

The duties of our physiotherapist were divided between two individuals: a gymnastic instructor, who was a nurse with special training, and a masseuse also specially trained. All treatment was carefully prescribed by a physician, who saw the patient two or three times weekly. Every patient was forcefully instructed to report immediately to the ward nurse or physician if anything unusual was noted, and all activity was stopped at the first sign of inflammation. Passive motion and manipulation under anesthetics were never used and massage was little used, the main reliance being on active motion within the limits of bearable pain and motion against resistance, either from an instructor or another patient, or on some piece of apparatus.

The physicians and staff made a conscious effort to maintain and improve the morale of the patient, working toward the development of an individual pride in accomplishment and confidence in ability to lead a normal life in spite of a handicap. Prosthetic appliances were not issued in this hospital and cases were not transferred to the unit where they were applied until the remaining muscles of the amputated limb were so strong that the patient could carry out stunts and was entirely confident of his ability to carry himself.

In sharp contrast to this physical and mental reconditioning of the amputee, and in the general the patient who was to return to civilian life, there seems to have been no effort worthy of note to recondition the soldier for return to duty. When a knee joint could be flexed through 90° and the limitation of extension was not over 15° so that a

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soldier could walk up and downstairs without much difficulty he was returned to a limited assignment type of duty without much attention to his general physical status. From then on the unit medical officer was supposed to supervise further activity, sending a man to front line duty only when he was entirely recovered; but this did not work out very well during the latter two years of the war.

Hospital 13, Garmisch-Partenkirchen  
Interview with  
Dr. Metzlar, formerly Chief of Medicine  
25 July 1945

This man had been a ship's physician for the Hamburg-Amerika line for seven years prior to 1932. His wife is from New York. He then practised internal medicine in Bad Kissingen, making occasional trips until 1935. At the outset of war he entered the army and was moved to Garmisch, where he had charge of the hospital unit to which all cases requiring special diets were sent. He was contacted because of his experience with nephritis and hepatitis. Now inactive, he appears extremely depressed and is very pessimistic.

Nephritis

From 125 to 180 beds in his hospital in special wards were assigned to nephritis cases. He estimates that he saw about 1,000 cases. He regards "war nephritis" as a separate entity because of the marked frequency and severity of edema and because only 10% of all cases showed any evidence of significant foci in the tonsils or sinuses, a percentage he regards as much lower than in civilian practice. His first remarks indicated a strong disposition to blame war nephritis on nutritional disturbances, but he stated that these cases began to appear on his wards in April 1942 and admitted that there had been no significant difficulties about food at that time. Still, he felt that nutrition was a factor because few officers and rear-zone soldiers were seen with the disease.

It is estimated that about one case in twenty had a normal blood pressure, but all other features of the disease, and that one case in ten had no hematuria, not even microscopic, but was otherwise typical. The diagnosis of war nephritis was not made in the absence of edema.



Treatment of the acute cases was aimed at the edema, hunger and thirst being prescribed for 3 to 6 days, followed by a very light, salt-free diet. Strophantin was given if the blood pressure was higher than 120 and nearly all severe cases were bled of from five to six hundred cubic centimeters.

The mortality was very low but the incidence of chronic nephritis as shown by an abnormal 1500 cc dilution-concentration test, with concentration of only 1.018 or less, is believed to have been 20%. A much larger number are thought to have remained mildly active as shown by the persistence of a trace of albumin and erythrocytes in the urinary sediment, and very few cases of the disease could be returned to full army duty.

### Epidemic Hepatitis

Dr. Metzlar seemed to have few ideas about the pathogenesis or general significance of this disease. There had been a large number of cases, most of them arriving in his hospital from 10 days to 3 weeks after the onset of symptoms. He had no idea what the incubation period may be.

His personal modification of usual treatments was starvation for two to three days, followed by a carbohydrate gruel of some sort, and later a diet low in fats and proteins. Hospitalization was nearly always longer than 60 days and there is a marked tendency to residual liver disease. The greatest number of cases appeared about a year ago and it is his impression that convalescence has been slower and less satisfactory since that time, perhaps because of inadequate nutrition and improper diet.

### Pneumonia

Nothing simulating primary atypical pneumonia has been recognized. Cases of lobular pneumonia which do not respond to sulfonamides receive Solvochin (a quinine compound of some sort made in Hamburg) and usually do well.

### Malaria

After experience on shipboard in Central America, Dr. Metzlar was greatly dissatisfied with the treatment of malaria prescribed by German Army directives. This was 0.3 gm. atabrin per day for a week, followed by 3 tablets of plasmo-chin a day for three days. "Then wait for a relapse. I have seen many, up to 16 to 20 attacks per case."

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Comment

It seems significant that this mediocre grade of general practitioner should have served as the physician in chief of a military hospital to which special medical cases were transferred.

Visit to Hospital No. 1  
Garmisch-Partenkirchen  
26 July 1945

German doctors in Garmisch who had been associated with the military group of 24 hospitals referred with great pride to this, their central unit. It had been completed in 1942 for use as a military hospital and was used as such until it was evacuated to make way for the 117th U.S. Evacuation Hospital, which was serving as a station hospital for occupation troops.

Through the courtesy of the commanding officer, Colonel Alfred Thom II, a tour of the building was made. It was stated that refuse had been accumulating for months before the hospital was taken over and that many of the mattresses had been soaked through with wound discharges, so that it was necessary to scrub them, sun them for five days, autoclave them and then use mattress covers.

The operating rooms and physiotherapy department were beautifully designed and equipped. The X-ray equipment had, however, been installed in makeshift space because of failure to include it in the original plans.

In spite of the purpose for which the hospital was constructed it seemed very similar to civilian hospital construction of ten years ago. The wards hold 4 to 12 beds and are too small for economical management as a military hospital and space for recreational and exercise facilities for soldier patients had not been planned. It was of interest that two chapels were provided, one in the main building and one adjoining the mortuary. These were decorated in a semi-religious manner and probably satisfied the religious element of the population without offending Nazi ideology.

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University of Innsbruck  
Interview with  
Dr. Hans Franke, Dozent in Internal Medicine  
27 July 1945

This man, the cardiologist and a full-time clinical research man in the combined out-patient and hospital unit of the department of internal medicine at Innsbruck, had university connections throughout the war. The Professor of Medicine was a strong Nazi who was promptly incarcerated by the French and the present head of the clinic, a hematologist named Hittmaier, has not officially been made Professor. Dr. Hittmaier spent two years as an inmate of a concentration camp and was then released and allowed to work at Innsbruck as a volunteer for the last two years of the war.

The normal size of the Medical School before the war was 600 students. This increased to 800 during the war, of which 500 were in the clinical semesters. At the outbreak of war the number of teaching assistants in internal medicine was reduced from seven or eight to five or six, and since 1943 there have been only two or three assistants. The medical school gave three semesters in one year only, in 1940, and then the regular course was resumed. A few students were allowed to leave after 9 semesters, but the majority stayed for ten or eleven.

The medical clinic had 200 beds for in-patients and a large out-patient service for use in teaching. One wing caught a bomb and was rendered uninhabitable, reducing the bed capacity to 100. To compensate, a branch hospital with 110 beds was established in a town 12 km. distant.

Medical problems

Dr. Franke said that epidemic hepatitis had been the chief single cause of disability during the war, although the cases were relatively mild, averaging four weeks hospitalization and a serum bilirubin in the neighbourhood of 4 mg. percent. No special treatments were used. There has been a definite increase in infectious diseases, particularly dysentery, tuberculosis and acute rheumatic heart disease, attributed to lowered resistance due to poor nutrition. This area produces little of its food and the disorganization of transport became so great about 8 months ago as to result in serious food shortages which still continue. Cibazol is used for dysentery as well as for respiratory diseases. No sulfonamide blood levels are done.

Pentic Ulcer

There has been a real increase in gastric ulcer of a type called "war ulcer", which is distinguished by the rapid appearance of a relatively large niche in the stomach wall, often so large as to suggest a malignancy. The treatment used by the former professor of medicine was an initial period of starvation to put the stomach at rest; then injections of Progynon, 10,000 units on alternate days for two weeks, then every third day for the next two weeks. This treatment was used for both men and women, but women were not treated just before or during the menses. Dr. Franke does not feel that this treatment offers any advantages in the prevention of recurrence, but perhaps the ulcers heal more rapidly.

There has been no significant increase in functional gastro-intestinal disorders or in thyroid disease.

"Bridal"

Dr. Franke feels that an injectable or orally administered synthetic drug, manufactured at Leverkusen by I.G. Farben, called "Bridal" is a definite addition to his therapeutic aids in allergic states such as urticaria and hay fever. This is supposed to neutralize histamine and in doses of two tablets after each meal seems truly beneficial. He does not know its chemical composition, or what pharmacologic background it has. It is known in France as "Antergen". He has used Torantil (histaminase) but feels that Bridal is considerably better.

Information with relation to this drug has been turned over to Drs. J. A. Leighty and R. J. Fosbinder, a CIOS team investigating pharmaceuticals.

Dr. Franke offered three of his reprints, which have been turned over to the Secretariat, CIOS.



University of Erlangen  
Interviews with  
Professor Herrish, Rector of the University  
Professor Goetze, Surgery  
Professor Muller, Medicine  
Professor Richter, Eye, Ear, Nose and Throat  
and Professor Mewthaler, Medicine  
30 July 1945

Teaching Facilities

The town of Erlangen had received only one bomb throughout the war, and this was a dud. As a result the University was in good physical condition and continued to function until the German surrender. The Rector was very anxious that the university should be allowed to resume its teaching by the fall of this year and was disappointed when he realized that our party was not empowered either to grant this permission or to make available a large number of supplies which the university needed.

Prior to the war the total number of hospital beds available for teaching purposes was 1,000 to 1,200. However, during the war other buildings were made available for patients as there was a tremendous increase in their numbers. This increase was due to: (1) absence of doctors in local communities, thereby forcing patients to come to the hospital for medical care and (2) the presence of between 3,000-4,000 military patients. During the past year there was a total of 9,000 patients in Erlangen. Under normal conditions the hospitals received patients from the entire Franconia district and therefore had an adequate amount of clinical material for teaching purposes.

Military personnel were treated by military medical officers as there was a sharp distinction between this group and civilian patients. The former were never employed for teaching purposes, nor did the medical faculty ever see them except on request and then only in the capacity of a consultant.

Medical Faculty and Assistants

The medical faculty had lost only one member of professional rank, although the assistants in the various departments had been reduced by 50%. Many of these had been replaced by women who, according to the standards of the university, had not in all instances had sufficient training for their new responsibilities.

At this point it is of interest to note a remark made by the Rector to the effect that "many brilliant doctors from devastated areas were applying for positions of any rank as there were too many doctors and not enough places for them to work."

### Medical Students

During the early years of the war the number of medical students was increased twofold, i.e. 4,000-6,000, but after 1942 the number was reduced to the pre-war figures of 2,000-3,000. This reduction was due to lack of available barracks for billets and not to changes in the university. Thus entire companies which were previously scheduled for Erlangen were sent to Freiburg or other universities where housing conditions were adequate. As a rule naval medical students were sent to Freiberg or Tübingen, while Army and Luftwaffe students received their medical training at Erlangen.

As early as 1934 and 1935 the faculty had noted that students admitted to the medical school from secondary schools were poorly trained in basic subjects. So poorly were they trained that it became necessary to introduce special courses for these students in order that they might be able to appreciate the medical lectures. These training deficiencies in secondary schools were attributed to: (1) the period of study in elementary and secondary schools combined had been reduced from 9 years to 7 years, and (2) so much time was demanded by political youth organizations that less time was available for class rooms. Demands from these political organizations were increased each year, with the result that basic education became progressively worse.

### Costs and Tuition

One thousand marks every four months was stated to cover all student expenses. The fact that the school was small and situated in a small town made it possible for the student to live less expensively than in such places as Munich and Freiburg. The actual tuition fee was 200 marks a term (4 months). During the war 90% of the medical students were soldiers and therefore on leave and paid for by the Army.

### Curriculum, Standard of Medical Training etc.

In 1941 the school reduced the number of semesters from three a year to two. This was done: (1) because it was felt that the student did not have adequate time to work on practical medical matters and (2) that he needed more time to digest what he had been taught.



During the first years of the war when the student body had doubled and the teaching staff had been reduced, it had been necessary to give some of the lectures as many as three times, but after 1942 this was no longer necessary. Air raids had not interrupted class schedules, but the air raid warnings (especially when air raids were made on nearby cities such as Nurnberg) had made it necessary to seek the shelters. This interruption was particularly annoying during the last 12 months of the war. Never did the interruption reach such proportions that it became necessary to hold classes at night.

The faculty interviewed emphatically stated that they had to stick to quality and not quantity, as that had always been their motto. Being a small school they had always taken great pride in the intimate contact between students and professor and felt that such contact produced the best medical student.

In view of the poor training in basic education and the constant interruptions during the course of medical training, it is obvious that the medical student was less qualified when he graduated than had been the case during the years prior to 1934-1935. Students who failed a course were allowed a second examination, but if they failed a second time they were removed from medical school and sent directly to the front lines. It was stated that since the examinations were given by the state and failure meant front line duty, the student was inclined to study harder to pass his courses than was usually the case and therefore was a better qualified doctor. On close questioning however, the faculty finally admitted that perhaps this was an exaggeration as the army frequently interfered with the students' studies by the application of work elsewhere. As a rule there were only about five failures a year.

This "application of work elsewhere" frequently consisted in sending the student to the front line as a sanitary officer and for actual battle contact with patients. Some thought that this contact did improve the medical training of the individual, but the majority of the faculty seemed to feel that this was a one-sided form of training and did not improve his general medical knowledge.

### Specialist Training

Post-graduate training for specialists was only available to those individuals who had been assistants before the outbreak of war. Young doctors were called into military

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duty as soon as they graduated, which made it impossible to specialize. The statement was made that neither medical nor surgical specialists were available. The great proportion of specialists in Germany were Jews. This was especially true in Frankfurt, Freiburg and Berlin, and since they were excluded from all medical schools, there naturally followed a great reduction in medical men of advanced training.

At the University of Erlangen the only students who were permitted to study uninterrupted were those in the Department of Theology. These men were excluded from all political youth party organizations by Hitler's orders. Furthermore all scholarships, financial grants and privileges were forbidden them, thus making it difficult for men from poorer families to study theology. Thus they were truly branded.

#### Interview with Prof. Dr. Ludwig Muller Medical Clinic

Prof. Muller, five years younger than his better known brother, the late Prof. Friedrich Muller of Munich, had been retired as superannuated and was only recently installed in charge of the Medical Clinic because the incumbent had been a Nazi. The expression Prof. Muller used about his return to active work was translated as "exhumed". His special interest had been the Autonomic Nervous System and his widely used text on the subject was published in 1920, has been translated into Spanish, and had its 3rd edition in 1933. His contacts with medicine have been in a narrow field for many years and it appears that his present status is that of a stop-gap administrator in a doubtfully adequate attempt to prevent the disintegration of the university's Department of Medicine. The interview was of value in showing the reactions of a man who assumed broad medical responsibility only after the termination of hostilities, after a period of little or no practical experience.

#### Recent Problems in the Medical Clinic

There had been a widespread incidence in Franconia of an acute form of enteritis, the cause of which was obscure. The onset is sudden, with fever in less than half the cases, no vomiting, only diffuse abdominal pain, no elevation of the leucocyte count, and a very active diarrhea. The stools are watery or mucoid, visibly bloodstained in about 10% of cases, and the diarrhea persists for 4 to 7 days. There are no proctoscopic changes, little microscopic pus, and no demonstrable pathogens on culture. Relapse occurs in up to one third of the cases, but complications or deaths have not



occurred. The disease has not affected young children and there are no recognized epidemiologic features to suggest a specific mode of transmission.

There has been a recent marked increase in pulmonary tuberculosis in acute forms, most evident in the past four weeks.

Both these conditions are related by the clinicians who have seen the cases to the abnormal nutritional situation in the community, but such opinions are probably colored by the personal experiences of the doctors, since it was stated that the average loss of weight among the members of the professional staff had been approximately 10 kg. in the eight weeks of American occupation. No specific deficiencies other than calories and proteins were postulated as a cause of this morbidity.

Epidemic Hepatitis. This was common in Erlangen in 1944 but the average case was not severe. A small number of cases have shown residual symptoms, enlarged livers and intermittent ascites, but deaths have been too rare for the clinicians to be much interested in the pathology. It was Prof. Muller's opinion that this was a war increase in a well known disease, but nothing new.

War Nephritis. Prof. Muller stated that this was much more common in the First World War than in this one (but he was treating soldiers then, while those he has been recently associated with have mainly treated civilians). Exposure, he thinks, is a strong factor as in arthritis, but he does not believe a specific virus of a new disease is operative. The treatment is that of Volhard (see Heidelberg, Siebeck).

Pneumonia. No clinical type which does not respond to sulfonamides is recognized, and failure to respond usually results in the diagnosis of "lobular pneumonia". Whatever sulfonamide is available is given in dosage of 3 or 4 gm per day for three days, the preference being for Cibazol (sulfathiazole) if it is available and hot wet compresses are applied to the chest. Strophantin is given only when indications for cardiac support appear, never for prophylactic reasons.

Typhus and Typhoid have not been problems in Erlangen clinic. No specific measures are known and there is no interest in the use of transfusions from recovered cases.



Multiple Sclerosis. This is common in the Erlangen Clinic, at least partly because of the reputation of the treatment used. This consists of Pyramidon (Amidopyrine) 2 gm. T.I.D. and the production of fever at intervals of 3 to 4 days by the injection of a colloidal sulfur preparation, "Sufrogel", in dosage sufficient to produce 4 to 7 paroxysms in the region of 104°F (40°C). The sulfur is used only for convenience and no new evidence as to etiology has been presented. Prof. Muller favors a lesion in the smallest vessels in the nervous system as the earliest recognizable abnormality. As in other instances in Germany, no follow-up material on this method of treatment was available, since patients are apparently lost sight of when they are well enough to return to their homes.

Infectious Polyneuritis. Many cases of a disease which receives this name have been seen in Erlangen in the past 6 to 8 months (see Erlangen, Maythaler). Abnormal spinal fluids are the rule when quadriplegia occurs, but no virus studies have been made. The prognosis for complete recovery is good. Recent experience suggests that the intravenous injection of Prostigmine 0.5 mg. twice daily hastens recovery of function.

Scarlet Fever. Prof. Muller dismissed the treatment of this disease with a wave of his hand and the word "Time". He did not believe that scarlet fever convalescent serum, antitoxin or sulfonamides were of any therapeutic value. The vast majority of the cases were mild and therefore did not require specific treatment, while those that were severe usually recovered anyway.

Diphtheria. The maximum dose of diphtheria antitoxin ever employed, regardless of how ill the patient may be, is 10,000 units. The usual dose is 6,000 units. All antitoxin is injected intramuscularly, the intravenous route being employed only in extreme cases. Prof. Muller stressed the large number of cases of post-diphtheric paralysis and myocarditis encountered in his clinic, but he states emphatically that they were in no way related to the amount of diphtheric antitoxin administered as "antitoxin had no influence or value in preventing post-diphtheric paralysis." (The term "post diphtheric myocarditis" is not used in his clinic, "post diphtheric myocardial damage" being considered as preferable.)

Meningitis. All types of meningitis are treated with Globucid (an ethyl sulfonamide manufactured by Schering). No specific dosage was employed and no blood level determinations were made. Treatment was continued for 3 or 4 days after which time the dosage (?) was gradually reduced over a period of several days.

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## Visit to Hospital Facilities

The building housing the Erlangen Medical Clinic is old but adequate, although the complaint was made that there were too many beds in each ward (16 to 20). The unit is compact with the X-ray department, electrocardiograph, doctors' offices, lecture hall and some laboratories in the same building as the wards.

The X-ray department, which took 20,000 films on 9,000 different cases in 1944, has adequate space and excellent equipment. There are at least three fluoroscopes with rotating anode tubes, one arranged so that the patient lies in a wooden basket and can be rotated and tipped in any direction by the fluoroscopist. There are also separate machines for taking routine films, chest films at 2 meters, laminograms and roentgenkymograms. Radiation therapy is carried out with two 200 Kv machines and some smaller units, one of which has a mounting which allows treatment to be applied inside the mouth, rectum or vagina. On the floor below, in a well equipped physical therapy department, there is a special machine for taking stereoscopic films and a stereoscopic viewing box arranged for taking measurements for the localization of foreign bodies by what appeared to be a cumbersome but probably accurate method. This work was a special interest of the Professor of Anatomy.

Electrocardiograms are taken inside a large, grounded, wire cage, either with the usual semi portable Siemens audio tube apparatus, or with a larger machine using the same principle, which takes current from two leads simultaneously and by means of its electrical circuits prints all three leads on a single film about 10 cm wide. Because of a shortage of this film, sensitized paper was being used with good results. A string galvanometer electrocardiograph is available in the Physiology Laboratory and the Professor of Physiology appears to have a courtesy type of supervisory control of the "heart station".

One of Prof. Muller's older assistants presented a long harangue on the cellular morphology of the intrinsic nerve plexuses of the stomach, which was of interest only in that such a man had been able to continue a rather esoteric and not too fruitful type of neuro-anatomic investigation during the war. Then a group of unusual cases of neurologic interest was shown, of which only the two acromegalics had received any treatment. Apparently no record of the visual fields had been made on either of these cases before or after radiation of the hypophysis.

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The hospital wards were neat but not impressively clean, and the beds were too close together. There was no evidence of arrangements to keep long-stay patients occupied or entertained and the general aspect was not cheerful. There seemed to be a high proportion of chronic diseases such as arthritis and valvular heart disease at a stage requiring no active treatment which would justify occupation of a bed in a fully equipped clinic. These patients would have benefited more from a sanitarium environment and regimen if special institutions for chronic disease had been available.

Interview with Dr. G. Kuschinsky,  
Medical Clinic,  
formerly Pharmacologist at Prague

Dr. Kuschinsky was introduced as the individual who did the first pharmacologic work on "Sympatol" (synephrin). Acting as an interpreter, this man seemed exceptionally interested and experienced in problems of the clinic relating to applied pharmacology.

The use of Pyramidon (Amidopyrine) in Germany

He believes this drug is preferable to the salicylates in rheumatic diseases because it produces no side reactions, even in large doses, is not a renal irritant and produces greater effects. Severe agranulocytosis has not to his knowledge been a problem in hospitals where the drug is used and there has been no particular interest in the dangers of self medication with it. He feels that the common dosage in the Erlangen clinic of 2 gm t.i.d., with some cases receiving 10-12 gm per day, is probably excessive, but has not commented because no untoward results have occurred. He does not feel that either duration of treatment or total dosage affects the development of agranulocytosis, but states that Pyramidon should be used with care in chronic arthritis, and that it is not so effective.

The use of Strophantin and Digitalis

Strophantin is to be preferred because of its lack of cumulative action. Since it can be shown experimentally that the cumulative action of Digitalis reduces the work capacity of the heart muscle, this effect is disadvantageous. When some cumulative action is desired, Digitalis lanata should be used in preference to D. purpurea, since there is less danger of cumulative toxicity.

Strophantin was criticized because of the ill effects of the rapid injection of large doses. When the ampule strength



was reduced from 1 mgm to 0.5 mgm of the drug and dextrose solution, 20 cc, was included so as to require slow intravenous administration, the results improved. Now many cases are started on treatment with 0.25 mgm of the drug. The original idea of feeding the heart muscle with dextrose has been discarded.

An effort to secure information as to what drugs are used by mouth to secure a digitalis-like effect failed because no member of the group being questioned recognized such a need. Presumably patients able to be ambulant are never regarded as needing such a drug. The only drug suggested for a patient with auricular fibrillation who is not decompensated but has a pulse deficit because of a ventricular rate above 100 was quinidine. Camphor was suggested as having similar pharmacologic action, but adequate laboratory studies to determine the possibility of clinical use have not been initiated.

Strophantin G (Oerabain) which causes necrosis if given subcutaneously is sometimes given intramuscularly mixed with procaine to relieve the pain of injection.

Dr. Kuschinsky knew of no new drug which he regarded as important in clinical medicine and stated that he believed no significant fundamental research in pharmacology or physiology had been initiated during the war years because everyone had been too busy with routine work. He was not familiar with the use of "Bridal" (see Innsbruck, Dr. Franke). He thinks Germany is probably about five years behind along most medical lines.

Interview with Prof. Dr. Friedrich Maythaler  
Director of Stadtklinik f. inner Krankheiten  
(Poliklinik) Erlangen

This alert and apparently highly intelligent internist was especially interested in metabolism, diabetes and liver disease before entering the Army, being author of the sections on the liver and gall bladder in a monograph on Pathologic Physiology published in 1938. In the army he served for more than two years as medical consultant for the Balkan area, including Greece, Salonika and Crete. He is thoroughly familiar with the problems of tropical disease encountered by the German Army in this area and, while no information as to new therapeutic methods except in malaria was obtained, he should be a valuable source of information to a Medical Officer who has had practical experience with the British and American Armies in the Eastern Mediterranean.



### Treatment of Malaria

Prof. Maythaler introduced a large dose treatment of severe malaria, using 0.3 to 0.9 gm atabrin intramuscularly or intravenously, sometimes with 0.5 gm quinine in addition. and claims a very low mortality (less than 1%) in comatose cases of malaria tropica. He is the author of the monograph on "War Malaria", Vol.6 of the series on tropical disease prepared by the Tropical Disease Institute of the Berlin Academy of Military Medicine, first published in 1942 with a revised edition in 1944.

### Epidemic Hepatitis

This was the second largest problem in the area he served and produced great disability, although the mortality was low. No treatment except rest and a high carbohydrate, low fat, low protein diet was used. Few cases went on to cirrhosis, but he feels that no case is fit for full duty for six months and that service in a very hot climate puts too much strain on the liver for at least two years after the disease. One case, mildly jaundiced and now asymptomatic, was seen in the hospital. There had been no treatment except diet and no special laboratory work had been done.

### Hypotension

Early in the Balkan campaign patients appeared with a clinical picture characterized by symptoms of exhaustion, hypotension at the alarming level of 60 to 70 mm of mercury, systolic and hypoglycemia at levels of 50 to 70 mg per 100 cc without symptoms of hypoglycemia crisis. These cases had spent three to six months in very hot areas performing strenuous physical exertion under considerable mental stress. The condition was attributed to climatic and (unspecified) nutritional factors, especially the former, until Prof. Maythaler found the same picture in civilians on his return to Germany two months ago (see Freiberg, Ziegler, and Furth, Henning). He believes the picture due to exhaustion of the "chromaffin system". While not impressed by the thyroid aspects of the clinical picture, he thinks there is some functional disturbance of this gland because of the interrelation between thyroid and adrenal. Treatment was difficult and it was seldom possible to return these patients to duty in his area. Sympatone (synephrin) was of only transient benefit and he felt that the most satisfactory approach was to "exercise the chromaffin system" by graduated dosages of insulin. The interviewer did not gather that any systematic attempt to rehabilitate such cases had been made.

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## Pneumonia

This disease was common; the mortality was low, but Prof. Maythaler suspected that the incidence of empyema and pleural effusion was higher since the advent of sulfonamides. Dosage was always low, 3 or 4 grams of Cibazol (sulfathiazole) daily for three days, or perhaps for an extra day or two if the response was not complete. To his knowledge blood sulfonamide levels were never measured in Germany Army practice (they were "too busy").

Asked if he were able to recognize any form of pneumonia which he knew in advance would not respond to sulfonamides, Prof. Maythaler produced an unpublished manuscript, "The Clinical Picture of Interstitial Pleuro-Pneumonia," the result of one of five surveys made by his assistants in different districts under his supervision. The description of the disease and the X-ray films of the chest which were reproduced are characteristic of Primary Atypical Pneumonia; he calls it "virus pneumonia". He learned of the disease from British medical officers who were taking care of prisoners of war in Crete, and later had more than 1,000 cases in the German Army. He also saw many cases with civilian doctors in Athens, but encountered disbelief on his return to Germany and is satisfied that the disease has not been present to any extent in Franconia within the past two months (see Tübingen, Benhold). He had instructed medical officers not to use sulfonamides but had not tried diathermy or other treatments.

## Muscular Rheumatism without Objective Findings

In response to a direct question Prof. Maythaler first admitted that such cases occurred in the German Army and then volunteered that it had been enough of a problem since early in the war to initiate many studies, none of which were conclusive. Detailed medical studies were done on a large number of soldiers with these complaints without turning up any abnormalities. Many questionable teeth or tonsils were removed, much physiotherapy given, but patients were usually returned to duty with their complaints. His theory is that the condition is a neuritis on a nutritional basis, but he has no supporting evidence in the form of cases showing muscular weakness or sensory or reflex changes, and he states that the condition was frequent in the Army, which was well fed, for two years before it became a problem among civilians.

### Pentic Ulcer

Prof. Maythaler thinks the proportional incidence of duodenal to gastric ulcer in the Army was ten or fifteen to one. Diet and alkalies were used in treatment after an initial period of feeding through an inlying duodenal tube "to put the stomach at rest". Stomach symptoms which were atypical, or where no ulcer was found, were diagnosed as gastritis without regard to the gastroscopic picture, even when gastroscopy was available, more attention being paid to the symptoms when the gastric acid values were high. After two to four weeks of hospitalization with diet and belladonna, these cases were returned to duty in units where special food was available.

### Reassignment in the Army on Medical Grounds

The German Army required that a combination of numbers and letters be assigned to a patient returned to duty from a lazarett or military hospital, indicating the type of disease or handicap and the duty category advised. Prof. Maythaler felt that the weakness of the system was that the average medical officer was unable to assign the numbers accurately and that the Army personnel system functioned well on the information it was supplied.

### Syphilis

Treatment was by four courses of concomitant neosalvarsan and bismuth, with rest periods of no treatment. Three or four months hospitalization was not unusual and the incidence of fatal hemorrhagic meningo-encephalitis due to neosalvarsan was so high in the hot countries that as many as possible of these cases were returned to Belgrade where a treatment center was set up. Arsenical agranulocytosis was also regarded as a fatal complication. Both this and arsenical dermatitis were treated with sodium thiosulfate in confident belief that it neutralizes arsenic. Nothing of the order of BAL was known.

### Congestive Heart Failure

Several cases in various stages of treatment for congestive heart failure without arrhythmia were seen. All were at complete bed rest. Food and water were withheld for 48 hours and given sparingly for the first week. On the day following admission the patient usually received 0.5 mgm strophanthin and 1 cc salyrgan intravenously in 20 cc of 10% dextrose solution. Ammonium chloride or nitrate was never used. Strophanthin was usually repeated at 3 to



4 day intervals, sometimes with thiamine chloride 10-20 mgm, and salyrgan might be repeated once or twice. No other treatment was used. A decompensated cardiac with broncho-pneumonia and fever had been given 4 gm of Cibazol in one day without effect, so the drug was stopped.

### Tuberculosis

Cases of pulmonary tuberculosis in which pneumothorax was being instituted and cautery release of adhesions were seen. Phrenic crush and thoracoplastic procedures were done in the surgical clinic and all cases requiring prolonged rest were later transferred to special institutions in the country. It was never necessary to institute pneumothorax in the absence of a positive sputum, because "if the X-ray findings are definite, prolonged search will always demonstrate the organism." No cultural or animal inoculation methods were used on sputum. There was no indication of attempts to secure early diagnosis and treatment of the disease in the community.

### Infectious Polyneuritis

Seven cases of quadriplegia resulting from this condition were seen, all with absent reflexes, two with sensory disturbances on the outer aspect of the thighs (one of these was the only case complaining of pain) and one with bilateral seventh nerve palsy. The latter lesion was the only one not given a good prognosis, and average hospitalization was estimated at six weeks per case. All cases were said to have abnormal spinal fluids as to protein and colloidal mastic tests, but only one had a lymphocytic pleocytosis and all spinal fluid pressures were low. None had sphincter disturbances, ophthalmoplegias or visual difficulties. No treatment other than thiamine chloride was being used, and this drug was in very limited supply. No precipitating factors had been elicited, except in one case where a history of angina was interpreted as diphtheria. The Guillaume-Barre syndrome was suggested in one case in which all spinal fluid reports were not yet available.

### "Empyema" of the Gall Bladder

This diagnosis has been made in the presence of right upper quadrant pain and tenderness, with fever and moderate leucocytosis in two older women. The treatment was entirely expectant, with morphine and small doses of atropin for colicky pains. No jaundice was present.

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Lung Abscess

A case of lung abscess which was improving under treatment with neocarsphenamine was shown. The dosage is 0.3 to 0.5 gm about twice weekly until a total of 4 gm have been given. The basis for this treatment in Germany is entirely empirical and is not related to any theories as to fusospirochetal etiology. There have been no untoward reactions and the treatment is regarded as efficacious because most cases improve and many heal, while Prof. Maythaler believes that spontaneous healing of a lung abscess does not occur. The treatment has been used in bronchiectasis, but the results are not nearly so good.

Hypochromic anemia

Implying that the condition is not clearly recognized in Germany, Prof. Maythaler detailed the clinical characteristics of "idiopathic hypochromic anemia" associated with achlorhydria, flat fingernails etc. and due to imperfect absorption of iron. In 1938 he reported a three-generation family tree with five cases of the disease and three cases of asymptomatic achlorhydria, referring to the Swedish, but not to the American literature on the subject.

Hospital Visit

There are 60 beds attached to the Poliklinik housed in a school building ten minutes walk from the main building. There are 12 to 24 beds per room, the latter number producing crowding. Equipment appeared meager, but the unit was scrupulously clean. The patients were clean and the linen fresh. The charts were not kept with as much detail as in some of the teaching hospitals, but were neater and more legible than most hospital charts. The nursing and professional staff appeared to be of adequate size.



Stadtkrankenhaus, Furth  
Interview with  
Prof. Dr. Norbert Henning, Director of Internal Medicine  
1 Aug 1945

This man was an associate of Schindler when the flexible gastroscope was developed. In 1934 he published a book outlining the place of gastroscopy in the diagnosis of stomach lesions and he is a recognized authority on the subject, having been visited before the war by many British and American clinicians, and during the war by a large number of Japanese doctors. He held a commission in the Luftwaffe and was in charge of a 60-bed hospital for "tired pilots" located close enough to Furth so that he could work in both hospitals.

His air corps patients were not selected because of stomach complaints, but many of them did have functional stomach disorders. These were treated by reassurance and the same regimen all other patients had, i.e. graduated exercise up to very strenuous wood chopping. No special diets or medications were used. He was not familiar with the term "channel stomach" but stated that almost all stomach complaints were in bomber pilots, who comprised the bulk of his patients, because of the fatigue and strain of long trips. The fighter pilots, who were in the minority, were more likely to have the "shakes".

Asked if he knew anything more about gastritis than in 1939, he made a categorical denial, but stated that he does know something new about ulcer.

"War Ulcer"

In 1943 Prof. Henning reported a type of peptic ulcer of the stomach with new features, which he called "war ulcer". It is quite frequent and he thinks it does much to account for what he says has been a ninefold increase in gastric ulcer during the war years. He also thinks duodenal ulcer has shown an actual as well as a relative decrease.

He attributes the new form of gastric ulcer to a combination of three factors: an inadequate diet; the poor quality and indigestibility of such foods as black bread, and the constant tension and feeling of being driven which every German had during the Nazi regime. Asked if foremen and minor executives who had to drive others were predisposed to ulcer, he said not, that everyone was being driven. He had noted, however, that the lesion occurred in people who lived on the minimum ration without being able to supplement it in any way.

There are several special features which justify a separate diagnostic terminology. The history is of short duration, one year or less. Loss of weight, probably due to anorexia, is the rule. There is no hunger pain or colic, but the patient complains of a heavy, painful feeling across the epigastrium, as if a weight were pulling down, coming on 30 to 60 minutes after a meal.

Many of the clinical findings suggest carcinoma. Occult blood is invariably present in the stool and the hemoglobin is down to 10 or 12 grams, even if no recognizable hemorrhage has occurred. The sedimentation rate is elevated, sometimes to 25 or 30 mm per hour. The gastric analysis rarely shows really high acid values and is often normal or low. The lesion can occur in the presence of anacidity, even after the injection of 0.5 mg of histamine. (The usual test meal is 0.2 gm caffeine in 300 cc of water; since caffeine has been unobtainable he uses 300 cc of 5% alcohol.)

By X-ray the "war ulcer" shows a large, deep niche which appears scalloped and is irregularly filled with barium because the base of the ulcer is uneven. As viewed in the gastroscope this uneven, granulating base is confirmed and there is a striking absence of the usual elevation of the gastric mucosa due to edema which surrounds the ordinary gastric ulcer. Prof. Henning states that a diffuse gastritis is an invariable finding when a classical gastric ulcer is seen, whereas the remainder of the stomach is normal or only slightly inflamed when a war ulcer is present.

In spite of these diagnostic features, there are no significant differences in the clinical course under treatment. Hemorrhage occurs with average frequency, in his experience, as an initial symptom. Healing occurs in average time on rest and diet treatment. He has not prescribed an alkali for 15 years, and while he has no objection to amphoteric substances, has not felt that he needed them. Recurrences are at about the same rate as with other ulcers (although it appears that Prof. Henning has little interest in the life history of the ulcer bearing individual).

Although he has had no personal experience, Prof. Henning is satisfied from the reports of men he knows to be reliable that there is no increase in peptic ulcer in the German Army. He thinks there has been little dysentery until recently and is sure that ulcerative colitis of the idiopathic type has not increased. A carbon copy of the article on War Ulcer which appeared in 1943 in Klin. Wochsft was furnished and has been forwarded to Secretariat, CIOS.

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#### IV. SURGERY, GENERAL AND ORTHOPEDIC.

##### University of Heidelberg

##### Interviews with

Dr. K. H. Bauer, Professor of Surgery

and Chief of the Surgical Clinic,

Oberarzt Dr. Usadel, General and Orthopedic Surgery

Oberarzt Dr. Kindler, Neurologic and Urologic Surgery

Oberarzt Dr. Geissendoerfer, Plastic Surgery

Dr. Oberdahlhoff, Vascular and Thoracic Surgery

#### General Considerations

The Surgical Clinic of the University of Heidelberg is said to be the newest and finest in Germany. It is of most modern construction, gleaming with marble, chromium and glass. There is a capacity for six hundred patients. The wards are clean and bright and of the latest type construction. The laboratories are extensive, but little used at present as they have neither glycerin, formalin, chemical reagents nor culture media.

The operating suite consisted of six large operating rooms with connecting scrub rooms and sterilizing rooms. Due to lack of coal for the production of steam, they are not able to autoclave their surgical supplies. They have therefore connected their sterilizers to electric heat and sterilize their goods in packs under one and one half atmospheres air pressure heated to 120°C for 40 minutes. They state that this method has proven satisfactory and has not resulted in increased operating room infections.

The X-ray department was most complete, including a tomograph. The fluoroscopic machine was of special interest. The patient is strapped to a board like an Egyptian mummy and can be rotated in a complete circle or turned on his own body axis with great ease. The whole machine can be placed in either a vertical, horizontal or intermediate position. The fluoroscopic screen can also be rotated in a complete circle about the patient, thus affording an unlimited range of views. The machine was manufactured by Ernest Pohl at Kiel. Pictures are appended with this report.

This clinic served both as a civilian and as a reserve military hospital throughout the war, the professor and his four assistants remaining at the hospital during this entire period. It is unusual for such a number of assistants to have been allowed to remain. During the Ardennes offensive

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the hospital received great numbers of casualties. Numerous doctors who have returned from the service are now serving in the capacity of ward surgeons.

The hospital diet for patients is said to amount to 1100 calories per day. This is obviously insufficient for surgical patients, most of whom are already suffering from pectein depletion due to infection. There are several wards of German prisoners of war who receive a diet from the American Army, but I could not ascertain how far this diet was distributed to include other patients. In general the patients appeared thin, even though their infection had been controlled. The 40 patients in the private pavilion were all well nourished. At the time of visiting the hospital had no plaster of Paris and depended entirely upon cement of the type used in road construction as a substitute. This cement required 24 hours to set and thus greatly hampered the treatment of fractures.

Dr. K. H. Bauer, who had been professor of surgery at the University of Breslau before coming to Heidelberg, is an excellent surgeon with a wide general ability in the field of surgery. His clinic is well organized and running smoothly.

### War Surgery

Professor Bauer stated that the Germans did not show great interest in developing plasma or other blood substitutes as they felt that albumin without red cells was insufficient for the needs of war surgery. The blood substitutes employed by the Germans were: (1) Normosal, which is saline plus glycokoll, a dextrin which has slight usefulness because of the size of the molecule, and (2) Periston, a colloidal substance which was widely used. More serum than plasma was employed as it was believed that there would be fewer reactions since the agglutinins for the red cells had been removed. Blood banks did not exist, as they prefer fresh direct transfusion. No intravenous amino-acids or other protein solutions were used. Casein by mouth was the only concentrate employed to increase the blood stores of protein. Dr. Bauer feels that blood transfusion offers the best source of protein in cases of negative nitrogen balance and is unaware of any experimental work on special protein concentrates. He believes that his surgical mortality rate is now much greater because of the low protein reserves of his patients. As an example he cites his mortality rate from perforated duodenal ulcer, which has risen from 24% to 40%.



## The Kuntscher Nail

The Kuntscher Nail has been in use at Heidelberg for five years. Its use is indicated in fractures where it is impossible to maintain reduction by other means, in fractures showing non-union, and in fractures with loss of bone substance needing bone graft. Dr. Bauer considers his clinic the German center for the use of this nail.

The insertion of one of these long steel bars, larger in diameter than a lead pencil, into a femur was watched. Prof. Bauer worked without gloves or mask through a huge incision over the site of the fracture. The ends of the bone were first freshened and shaped. Then a stiff wire director with a sharp point was passed up the marrow canal of the upper femoral fragment until it emerged in the region of the greater trochanter. Another large incision was then made over the trochanter and the director located. The nail which is U shaped in cross section, was pounded down over the director to enter the marrow canal of the upper fragment and finally down into the marrow canal of the lower fragment. The wounds were then sutured, using heavy catgut for ties and stitches. While operating the professor talked continuously and at no time wore a mask.

The post-operative management does not include the use of plaster on the extremity. Motion is begun in six or seven days. The professor stated that at the end of three weeks patients with this operation walked to air raid shelters by themselves. They had to do so. Later, on ward rounds, several of these cases who had been in bed for three months were seen.

When there is a large defect in the bone the procedure is divided into three stages. At the first operation the nail is inserted. After six to eight weeks the second stage is performed which consists of an onlay skin graft. Following a period of months when the graft is securely fixed, the nail is removed. Nails of smaller size are used in the tibia, radius and ulna, as well as the femur. If there has been infection in the bone at some time, the nail is not inserted until at least a year after the infection has subsided.

Prof. Bauer said that infection does not occur following the use of the Kuntscher nail unless there has been previous osteomyelitis. He also states that he has never seen any infection in the cases that he has operated upon himself. With the aid of a medical student, each of the

nine cases in the hospital that had had a Kuntscher nail inserted were inspected. Three were failures because of infection and draining sinuses. In three the nail had been inserted less than four weeks previously and no infection was present. The remaining three had been operated upon four to ten months previously and showed satisfactory progress with no evidence of infection.

The remaining fractures of the extremities seen in the clinic were being treated with skeletal traction with the idea of applying plaster later when fixation had occurred. Internal fixations are done by placing fine steel wire about the fragments.

### Plastic Surgery

For free grafts the Thiersch type is used. The grafts are placed on the granulating surface, covered with silver foil, then gauze, and finally a rubber sponge is bound into place. The first dressing is done after eight days. The pedicle and tubed graft procedure is identical with the American method. Five cases of loss of tissue from freezing of the heel had been repaired by pedicle flaps from the thigh. Two of these were seen after six months and were in good condition.

One half percent solution of sodium bicarbonate is regarded as the most effective agent in the treatment of pyocaneus infection. The method of treatment for large wounds is to leave dry dressings on as long as possible. Then boric acid ointment is used when the granulations begin to form. Finally Scarlach R ointment is used for epithelialization.

Arthroplasty for metacarpo-phalangeal joints consists merely in resecting the joint. Movement is started on the 8th to 10th day and must continue for four months. Six cases have been done who are able to close their hands.

Severe burns are kept in a continuous bath of water at 34 to 36 C. Small repeated blood transfusions and saline solutions are given intravenously when indicated. There is no control of this therapy other than the determination of the patient's hemoglobin level.

### Neurosurgery

Whenever the front was stabilized, cranial wounds received their definitive treatment in forward areas twenty to forty kilometers from the front lines by trained neurosurgeons. Penetrating wounds of the brain were treated by aspiration and gentle irrigation.



The choice of method to close the dura was to divide the layers of the dura and throw the outer layer over the defect. Fascial grafts were also used. Prepared human amnion was used but infection sometimes occurred in these cases. However, they are not sure that the infection was caused by the amnion.

Most of the skull defects were left uncovered. They did use Plexi-glass, but infection occurred in some of these cases. Scalp defects were closed with Reverdin or Thiersch grafts.

Nerve suture was not attempted until nine to twelve months after the injury. The nerve was not explored unless all foreign bodies had been removed and the joints were movable, as they feared the results of lighting up a "sleeping infection" if exploration were made sooner. Fine silk was the suture material used.

For cerebral fungus, cisterna punctures were first tried, with hypertonic sucrose intravenously and magnesium sulfate rectally. A badly infected fungus was resected with the electrosurgical unit, though the danger of bleeding was great.

The neuro-surgeons were very fond of using a drain made of sponge rubber for brain abscesses, as they believed that the pulsations of the brain "pump" the exudate out of the abscess by compressing the sponge rubber.

Prof. Tonnis, who was in charge of neurosurgery in the German Army, had his assistants in forward hospitals. The patients who were treated by these men came back to special reserve hospitals which were also operated by men on Prof. Tonnis's staff.

### Thoracic Surgery

Empyema following thoracic injury was very common in the German Army. At Heidelberg they estimated that 25% of such cases developed empyema. Some forty cases of empyema were seen in this hospital and a similar number in other hospitals visited. This was three months after the war was over. Their surgical methods were the same as those employed in America for this condition. Conservative management with repeated aspirations of the hemothorax was the rule. This was replaced by surgery when indicated for sucking wounds, laceration of the lungs with hemorrhage, large foreign bodies etc. Sulfathiazole was used in these cases, but only according to their conception of its proper use, which meant

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that patients received it for three days at a time only and then in very moderate doses. This three-day course was not repeated more than once or twice. The agent was not used locally in the thoracic cavity.

The surgical treatment of empyema consisted of closed drainage supplied by a large tube inserted transcostally. Irrigation is never employed. Water siphonage suction is then applied and is initiated by producing suction with a difference of only one foot between the suction bottles. This distance is gradually increased until the bottles are six feet apart. Even though the empyema becomes chronic, the Germans place great reliance upon this suction. At Heidelberg they continue this procedure for a period of six to nine months before abandoning it in favour of thoracoplasty. A case of typhoid empyema was seen in which the empyema developed six weeks after the onset of the typhoid fever.

Prof. Bauer was observed while performing a thoracoplasty for chronic empyema with a large cavity. He removed sections of the first nine ribs very neatly with minimal trauma and hemorrhage. The operation was completed by making incisions along the whole length of the bed of the removed ribs. These incisions were cut through the entire thickness of the parietal pleura, thus reducing the intercostal structures to a series of ribbons which collapsed on the visceral pleura.

The large number of cases of empyema in the German Army is in marked contrast to the very small number seen in thoracic injuries in the U.S. Army. The explanation for this difference is difficult, though one is inclined to believe that the intelligent use of chemotherapy, particularly penicillin, both parenterally and locally is responsible. It is also very probable that through lack of trained medical personnel aspirations of hemothoraces were not faithfully performed among German patients.

Foreign bodies were removed from the lung when they were associated with empyema or bloody sputum. Stress was not laid on the shape (whether ragged or not) of the foreign body. It was stated, though with no great conviction, that foreign bodies over two centimeters in diameter should be removed. A case of empyema was seen which had appeared two years after a splinter type metallic foreign body had lodged in the costo-phrenic sinus.

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Thrombosis and Embolism

Tenderness on pressure on the calf or on the heel is considered the most valuable diagnostic point in thrombosis of the tibial or plantar veins. German treatment is to bind the leg wherever thrombosis exists with elastic adhesive (elastoplast) and start immediate walking. The only time that femoral vein ligation is performed is when there are repeated small pulmonary emboli. If no clot is found after the femoral vein is exposed, the hypogastric vein is exposed. Clots have in such instances been found in the hypogastric vein, and the vein ligated. Heparin has been tried intramuscularly, but has been abandoned as of no therapeutic value. (This was no doubt an impure product of little potency.)

An iodine compound called Vasoselectan which was made by Schering at Hamburg was used to produce some very good venograms and arteriograms. The Germans agree that while the demonstrations of the venograms were excellent, their diagnostic value was very small. At Heidelberg Vasoselectan is used for cerebral arteriograms as well as for arteriograms of the extremities, while at Erlangen its use is confined to the extremities, as they feel that coma and convulsions are caused when it is injected into the carotid artery. Thorotrast is injected instead into the carotid artery and excellent arteriograms are obtained. These assist greatly in the localization of a brain abscess. Prof. Baurer of Heidelberg believes that thorotrast carries the danger of subsequent development of malignancy.

Causalgia is treated by sympathetic nerve blocks, or pre-ganghonic section of the nerves.

Anesthesia

Ether by the open drop method is the procedure of choice for general anesthesia and is used to the exclusion of almost anything else. However, the anesthesia is usually induced with ethyl chloride, evipal or avertin. Local anesthesia is used for major procedures on the thorax, such as the removal of a mediastinal tumor or lobectomy.

The Krukemberg Stump

This operation was described by Krukemberg in 1895 and is mentioned here as the Germans have been making frequent use of it. Both doctor and patient have expressed satisfaction with the post-operative result.

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At least one half or two thirds of the forearm must be present in order to perform this operation. In its simplest terms, the operation consists of dividing the tissues between the radius and the ulna so as to convert the bones into two prongs, covered with skin, which can be used for grasping. The division between the bones must never be made above a point ten centimeters distal to the olecranon. All muscles from the upper arm attaching to the forearm are preserved. A pedicled skin flap is necessary to cover the bone completely. The circulation is most important; the interosseus, ulnar and radial arteries must all be preserved.

The stump can be used as the motor for a prosthesis if the patient does not like the cosmetic effect. However, because of the tactile and kinaesthetic sensibility that remains, all of the patients prefer to use the stump alone. Bauer has recently constructed five of these with excellent results. He states that 90% of the function of the hand is a simple grasping function which can be performed by this stump. Pictures showing performance of the stump are appended with this report.

The principle of the operation can be applied to the hand which has lost the thumb and all of the fingers. All of the metacarpals except the first and fifth are removed. The central carpals are also removed to allow more room for grasping. The muscles are left in place.

#### Tendon Transplant for Radial Paralysis

Prof. Bauer has operated upon twentyfive cases of this transplant with very satisfactory results. He intends to publish this work when possible, as he believes he has originated this operation. In this he is mistaken, but it is believed the operation is worthy of mention here.

The operation is used in cases where, as a result of lack of substance, or failure in repair, the radial nerve is permanently interrupted. It is technically very simple. The flexor carpi ulnaris is removed from the pisiform and freed for a distance of ten centimeters. Then it is tunnelled subcutaneously around to the dorsum of the hand, where it is joined to the tendon of the extensor digitorum communis. It is not necessary to surround it with paratenon.

The flexor carpi ulnaris hypertrophies to the point where it is distinctly visible on the forearm. At first it merely extends all of the fingers at once, but later on an interesting adaptation occurs and the patient learns to extend one finger at a time. This is possible because he



automatically antagonizes the action of the transplanted tendon with all his flexor tendons except one. The action of the transplanted tendon is to extend one finger. There is no question about the strength of the newly built extensor apparatus. Bauer found that the hand with the transplanted tendon could do 1.950 kilogram/meters of work in extension. The extensor apparatus of the normal hand (the left hand in this case) could do only 1.720 kilograms/meters of work.

The German statement that they saw no cases of cold injury is significant in view of the fact that they cared for fresh casualties during the Ardennes offensive of December 1944.

Prof. Bauer performed a partial resection of the stomach with great finesse. The dissection was expert. Again he talked incessantly without a mask and did not wear gloves. Nevertheless the lack of post-operative febrile reaction seen among his abdominal cases following surgery was impressive. One would expect more reaction with the disregard of antisepsis, plus the heavy catgut suture material used. He explained the lack of reaction, of which he was very proud, as being due to the careful peritonealization of all surfaces.

One of the younger men who had been in the Army was asked how they determined whether a soldier who complained of backache was malingering or had some fibromyosites. His answer was that he used the method of Dr. Meester of Vienna, which is as follows: A total leucocyte count is made. Then the patient is given a half grain of salicylic acid in solution. At the end of three hours the total leucocyte count is repeated. If it is diminished by from 15 to 25% there is a rheumatic basis for the soldier's complaint.

#### Recommendations

Prof. Bauer is operating an excellent clinic and should be left in charge of his organization. They are in real need of such material as plaster of Paris, formalin, glycerine and agar. The lack of these materials seriously handicaps their work.

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Orthopedic Clinic, Schlierbach  
(5 kilometers from Heidelberg)

Interview with  
Prof. Dr. Otto Dittmar, Chief of Clinic  
17 July 1945

General Considerations

The Orthopedic Clinic is housed in several buildings, all interconnected, of stone construction, and although not new they were clean and neat throughout. During the war the clinic served both as a civilian and military hospital. At the time of visiting there were 240 soldiers, 200 adult civilians and 100 children in the hospital as patients. Dr. Dittmar stated that as soon as the Americans arrived a "sanitary officer" forbade him to have anything further to do with the military patients and turned them over to two former German military surgeons who had previously worked under his instruction.

By comparing the civilian and military patients, and by questioning the professor on what he would have done in the instances where poor judgment and technique had been shown on the military patients, the conclusion was reached that it was a mistake to divorce the professor from the care of the military patients. The burden of their hospitalization will be considerably prolonged on the U.S. Army which guards and feeds them as prisoners of war.

No teaching had been done in this clinic as difficulties of transportation prevented the medical students at Heidelberg from going to Schlierbach.

Prostheses

At first prostheses for amputations were discussed, and then patients in the wards were seen.

Dittmar prefers only the lower leg and thigh amputations for the fitting of prostheses and has reamputated all of the many Gritti-Stokes type of stumps that were sent to him. He will leave a Syme stump, but will reamputate a Chopart. It was stated that he could fit adequate prostheses moving the knee on a thigh stump which measures 12 cm or more from the great trochanter. For a stump less than 12 cm, he must fit a stiff-kneed prosthesis. A lower leg prosthesis can be fitted and given normal knee motion if the stump measures at least 8 cm from the tibial tubercle. If the patient refuses further amputation and has too short a stump below the knee, Dr. Dittmar builds a knee joint into the prosthesis and slips this short stump into it.



As soon as the wound is healed he starts binding the stump and continues this for two or three weeks. A pylon is fitted at this time and bed exercises to accomplish hip extension and to prevent contracture are vigorously given by "exercise girls". All patients showed beneficial results from this treatment. After the prosthesis is fitted the patient is kept at work about the clinic for two or three months until he has learned to stand on his prosthesis for long periods of time. During this period he attends "walking school" regularly, where he is taught to take small even steps with his prosthesis to match the normal leg, to walk sideways, backwards, and even how to fall down so as to be able to manage himself in all situations. Keeping patients this length of time permits the doctor to observe and treat any ulceration or inflammation that might appear in the stump from wearing the artificial extremity.

The preferred prosthesis is made of wood at the clinic workshop. It is carefully carved out to fit the contours of the stump, plaster models and serial cardboard sections being used as guides. Dittmar believes that metal is too light and suffers from oxidation.

For thigh stumps a prosthesis weighing 5 lbs and with the usual joints at forefoot, ankle and knee is used. It is fastened by a strap over the shoulder on the same side and the knee is bent by the usual thrust of the thigh stump. Most of the weight bearing is on the tuberosity of the ischium. For well formed thigh stumps of middle or short length Dittmar uses a prosthesis that is fastened to the stump by suction only. Suction is obtained by a one-way valve in the socket of the prosthesis below the point reached by the stump, which permits air to go out. Thus as the stump moves in the socket, it forces air out of the valve and increases the suction which holds the prosthesis in place. This prosthesis is a favourite with patients.

The prosthesis for the lower leg is likewise made of wood. It is fastened to the body only by a single wide leather strap about the thigh.

For upper arm stumps a purely cosmetic prosthesis is provided for intellectual workers who wish it. For laborers the "work arm", a powerful prosthesis with strong locking set screws fixing its joints in any position and interchangeable hook hands of different types, is provided.

If the lower arm stump includes at least one half of the forearm, Dittmar prefers the Krukemberg stump. One was seen which he had fashioned that worked very well and was

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very satisfying to the patient. If the forearm stump is shorter than one half the length of the forearm, a prosthesis is used in which the grasp of the mechanical fingers can be controlled by the patient. The grasp is activated by the motion of supination and pronation remaining in the stump. This has been very satisfactory. The clinic also uses a cine-plastic device called the Sauerbruch arm, but had no examples to show.

### The Kuntscher Nail

Dr. Dittmar did not use this nail and had nothing good to say for it. He stated that it is not usually necessary as some other more satisfactory procedure can be substituted. He also felt that the nail delays healing when it is used in cases of non-union and that infection is often associated with its use. As a further danger, fat emboli with resulting death may occur from its employment. Professor Böhler of Vienna has already given it up as an unsuitable procedure.

### Osteomyelitis

The basis of his treatment was immobilization and sequestrectomy as indicated. Many cases of osteomyelitis were seen in casts with windows for dressings and there was copious purulent drainage on all of them. The wounds are dressed daily with cod liver oil ointment, which is varied with a paste made of pine resin and vaseline. Certainly this treatment has nothing of interest, being far behind our principles in the treatment of osteomyelitis.

### Amputation Stumps

In the military part of the hospital over which Dittmar had no control, there were numerous patients who had received a second amputation. These stumps should have healed with primary union, but they had failed to do so. In many instances they had broken open, while others showed large drains in place which should not have been used in these stumps.

### Physiotherapy

The physiotherapy department contained the usual devices seen anywhere. However, there was one room which contained a number of steel cylinders of varying sizes. The patient's extremity was wrapped in flannel and placed in the cylinder. Then steam at 65°C is run into the cylinder while active exercise of the limb goes on. The treatment lasts about 30 minutes and is one of their favourite methods of physiotherapy.



Recommendations

It is strongly recommended that Prof. Dittmar be given charge of the military patients in the hospital. This would result in much more efficient care of these patients and would shorten their stay in hospital.

University of Tübingen  
Interview with Dr. Willy Usadel,  
Professor of Surgery and Director of the Clinic.  
20 July 1945

General Considerations

The surgical clinic at Tübingen is located in a fine structure of modern appearance. It embodies all the latest architectural features and has beds for 600 patients. At present it has been taken over by the French as a hospital.

Dr. Usadel, a former pupil of Kirschner, had been professor at the clinic for 15 years. During the war he was consultant to the German Army on the Eastern front and his assistant became chief of the clinic. He appears to be a competent man but is greatly discouraged as he has now neither clinic nor instruments, both of which are being used by the occupying forces. Dr. Usadel will probably not continue his title as chief of the clinic, though at present he has a staff of one male assistant and three medical students. Beds for 80 women in the gynecologic clinic and for 60 men in the eye clinic are available to him.

War Surgery

The professor stated that wound infection is practically unpreventable during war, and that wound excision is the most important single feature in the management of war wounds. Sulfonamides both orally and locally are of doubtful value. German soldiers did not carry "wound tablets" and so were unable to put sulfonamide powder into their wounds at the time of the emergency dressing. Secondary closures in our sense of the word were not done. Occasionally the skin would be pulled over the granulatory area weeks later or the area would be grafted with Thiersch grafts.

Burns were always treated by tannic acid spray after preliminary cleansing of the burned area; infection was common. When indicated blood transfusions were given, but then only in small amounts (250 cc). The only other fluid available for parenteral use was saline solution which was occasionally used. At times wet and dry plasma was available. Dr. Usadel preferred periston as a blood substitute.

The German Army used tetanus anti-toxin in 3,000 unit doses as a prophylactic measure. In five years as a con-



sultant Dr. Usadel knew of only ten cases of tetanus. The treatment consisted of administering the anti-toxin intravenously and intrathecally and using paraldehyde as a sedative.

A distinction was made between gas abscess and gas gangrene, incision being advised for the former and amputation for the latter.

In the treatment of frostbite he emphasizes the necessity of keeping the feet dry and using a sulfathiazole powder on them. In the presence of pain para-vertebral sympathetic blocks are performed, as it is thought that pain causes arterial spasm. At first the Germans used a method of slow warming by wrapping the extremities in blankets. Dr. Usadel noted that the Russians used quick warming by placing heated stones about the extremities. This was tried and found to give much better results, though it was never known exactly to what temperatures the extremities were exposed by this method. When gangrene threatened the extremity was exposed to the drying effect of a current of warm air passed over it by an electric fan. It is interesting to note that the cumulative reports from various sources all agree on the use of heat for these extremities. The term trench foot is never used. When the condition was described to them clinically and pathologically, they said they had not seen it. All of their cold injury is spoken of as frostbite, and it probably is that.

### The Kuntscher Nail

Most German clinics apparently feel that they must use the Kuntscher nail if they are to be considered abreast of the times. Dr. Usadel was not enthusiastic about it, but listed the following indications: Uncomplicated fractures in which reduction cannot be maintained except by this type of internal fixation; this applies usually to the femur. He also uses it for non-union when there is no bony defect. A year is allowed to elapse after the original wound has healed before using this technique because of the fear of "sleeping infection". He does not approve of the Kuntscher nail in cases where there is a bony defect in conjunction with an onlay graft, preferring in such cases simply to wire the bone graft in position with circular wires. Only one infection has occurred in twelve instances where he employed the Kuntscher nail.

### Non-Traumatic Surgery

In surgery involving the oral cavity, Dr. Usadel uses "Tuffon" as a hemostatic agent. This substance is made by

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the Linger Werke, Dresden, from plants of the Tragant group. It was stated that the agent accomplishes very good hemostasis without irritation and that it is readily absorbed.

Dr. Usadel has made a close study of the circulation of the stomach and has found that the right gastric and the right gastro-epiploic arteries are sufficient to nourish the organ. This fact is utilized in operating for stricture or malignancy of the esophagus. He claimed that he could bring the stomach up in the chest as high as the third rib anteriorly after resection of the esophagus without serious digestive distress following - a method originally described by Kirschner.

University of Freiburg  
Interview with  
Dr. Buechner, Professor of Pathology  
22 July 1945

General Considerations

The surgical clinic was completely destroyed by bombing. At present Dr. Edward Rehn, a very elderly man, is professor of surgery and director of the clinic. He has 250 beds in a hospital in Glockerbad, which is 15 kilometers from Freiberg.

After obtaining these facts from Dr. Buechner, an appointment was made to meet Dr. Rehn and other members of the faculty were present, but Dr. Rehn was not. They had not been able to locate him.



Interview with

Dr. Ulrich Henschke, who has been doing  
special experimental work for the Luftwaffe  
24 July 1945

General

Dr. Henschke's laboratory consisted of two small wooden buildings situated on a mountain side. Here he had been studying methods for improving the efficiency of aviators. His studies included both drugs and mechanical devices, as the doctor is well trained both as a physician and physicist. He stated that he wished to apply his knowledge to those mutilated by war and had therefore been concentrating on practical mechanical devices. This man seemed to be both very intelligent and practical. He has been visited by many investigating teams to whom he has communicated his ideas. Out of their reports has grown a somewhat exaggerated view of the extraordinary prostheses which he has devised and fitted. The fact is that these prostheses exist only as ideas or have been only partially constructed. They have never been in full and active use.

Projected Prostheses for the Extremities

For the upper extremity Dr. Henschke conceived a prosthesis to be used on arms which did not have sufficient stump remaining to activate the prosthesis by means of the motions of pronation and supination. Previously these patients had received either a hook for working purposes, or a prosthesis for cosmetic effect only. A few had received operations to permit the so-called cineplastic prosthesis, but the surgery involved to make these muscle motors was both difficult and time consuming.

The standard type wooden forearm was constructed with an electromagnet inside it. Activation of the magnet worked the hinged fingers so that they met the thumb in the action of grasping. The hinge was on a ratchette which locked the fingers against the thumb in this grasp. Release was accomplished by a small pin which was situated on the radial side of the first metacarpo-phalangeal joint. Pressing this pin against the body or another object caused release of the grasp.

The battery supplying current could be carried in the pocket. Dr. Henschke stated that contact which would close the circuit could be accomplished by touching the great toe to the top of the shoe. If desired the five toes could be trained to make each of five contacts as desired in order to activate each of the five fingers.

Dr. Henschke was also in the process of constructing the usual type prosthesis for amputation through the thigh. Into this he planned to fit an electromagnet and ratchett combination to fix the knee joint of the prosthesis in one of several desired positions. The doctor thought that it would be a real practical advantage to be able to fix the knee joint firmly in various degrees of partial flexion as the amputee desired. Contact control was to be in the other toes or in the hand.

He had a visionary idea also of controlling the knee action with action currents of the sciatic nerve. Tracings of action currents in thigh amputees had been made. However, it was admitted that this idea required a great deal of further investigation. The problem of constructing an amplifier for the action current that would be sufficiently portable and cheap had yet to be solved. Also unsolved was the question of muscle currents interfering with the nerve currents.

Before the war this man had worked at the University of Munich. There he had begun an apparatus containing a large radium bomb. It was so constructed that it would rotate in a complete circle about the particular organ to be treated, the patient's body lying in the center of the circle. Thus the tumor would receive bombardment equally from all directions during the course of treatment.

A tube with the radium bomb in one end had also been devised. After the abdominal wall was opened, this tube was placed against the tumor or the regional lymph glands for a treatment with radium. It was used in both operable and inoperable cases.

Dr. Henschke also stated, confirming the comments of others, that short wave therapy had been used beneficially in the treatment of cases of frostbite of the extremities (see Erlangen report).

### Recommendations

The inventiveness and good practical sense of this man should be used further if it can be determined that his work will be toward peaceful ends.

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Garmisch-Partenkirchen  
Interview with Dr. Bering  
Chief of the Rehabilitation Hospital

General

Dr. Bering was formerly a general practitioner in Munich with five years postgraduate training. He was given charge of what is called the Sports Hospital on the Riessersee at Garmisch-Partenkirchen and all patients in that army area were sent to him for reconditioning. The hospital was of 400-bed capacity, over half the patients being amputees. The hospital itself was not visited as the doctor had been evacuated from it and was working in a former hotel. We were told that it was modern in every respect with extensive facilities for all kinds of sports including aquatic sports on the Reissersee.

No surgery was done at this hospital. There were 20 patients on the average who were as a rule confined to bed because they had developed some inflammation after arriving at the hospital. Dr. Bering does not believe that rehabilitation is successful at the general hospitals on account of lack of personnel, unsuitability of location and equipment, and the fact that physicians at general hospitals have not the time or the interest for it. Dr. Bering seemed very capable and intensely devoted to this type of work.

The doctor considered the following personnel necessary for a 400-bed hospital of this type, although he by no means always had them himself: 2 doctors, 25 persons trained in giving individual and corrective exercises, massage and other physiotherapeutic procedures, and 25 group gymnastic teachers. Their rehabilitation program was not as complete as ours. A patient could leave if he were strong enough to walk up a flight of steps unaided. Following this he was sent to duty in a special rehabilitation company behind the lines. Thus more personnel would be needed if retraining along military lines were added as it is in the U.S. Army.

General Principles of Rehabilitation according to the German Viewpoint

The outlook in Germany is against artificial aids and extensive physiotherapy. The chief purpose of their rehabilitation is to secure natural movement of the wounded member along with the normal member. This purpose is always kept to the foreground of any activity; however, the patient is not made to feel aware of it. Exercise must be pleasant and all movement enjoyable to him. Every day there must be some

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new diversion and a cheerful and hopeful atmosphere must be created. General exercises to prevent stiffness throughout the body are always associated with special exercises for the wounded member. Partnership exercises and group exercises in which there is an element of competition are favored. Great emphasis is placed on a large variety of sports with the idea of making a real sportsman of the patient, no matter what his handicap. A sincere attempt is made to promote the patient's confidence in life by teaching him to do anything alone and making him proud of his ability.

### Bed Gymnastics

Emphasis is placed on the fact that the whole treatment must be handled by the physician in charge, since exercises are begun before wound healing is complete. Osteomyelitis is not considered a contraindication to these exercises. Exercises are begun as soon as local swelling has subsided and the drainage from the wound diminished to a small amount. At the first sign of an elevation of temperature, an increase in pain, or an increase in the amount of wound drainage, the exercises are stopped.

The purpose of these bed gymnastics is to make the patient ready to get out of bed and to prevent general stiffness. The exercises must be done quickly, lasting not more than ten minutes, as the body is not normal and tires easily. Therefore only the most useful exercises must be employed, avoiding excessive movement and excessive fatigue. Fresh air is let into the room, pillows and blankets are removed and an atmosphere of new life is injected.

The prone position is extensively used because under ordinary circumstances the patient gets no opportunity to extend his joints while in bed. Exercises are begun with the toes and move up gradually over the body to the fingers. Use of the feet and legs is encouraged by having the instructor hold a large ball in his hands while the patient pushes against it. Extension movements are particularly necessary for the soldier who has had an amputation through the thigh. A rope held in the hands gives the arms something to pull against while they are in motion. New exercises and new apparatus should be added daily whenever possible. Faradization is used to strengthen muscles even when the nerves are not injured. Pain can be depended upon to limit the extent of motion and prevent over exertion. Exercises are best when made against resistance in the form of light weights. The resistance can be gradually increased by additions to the weights. An apparatus was shown to



correct foot drop while in bed. It consisted of a wooden box containing two pedals similar to the pedals used in the old fashioned music organ that required pumping. By this reciprocal motion the uninjured foot would press exercise upon the injured one.

### Special Methods used in Injuries of the Hand

Injuries of the hand will be described in some detail as the treatment will serve to illustrate the principles employed in this rehabilitation hospital. The same principles were followed in the treatment of other injured joints. The basic purpose of the treatment is to strengthen muscles and make the joints movable. This is accomplished chiefly by the application of a light force over gradually increasing periods of time. Exercise against light resistance is a valuable component of the method. Massage and passive movement are used sparingly if at all.

Little movement of the finger joints is permitted until the wound heals. For the finger stiffened in extension a segment of stockinet is cemented to the finger. A cord attached to a small weight of 30 to 50 grams to begin with is then tied to the segment of stockinet. The palm of the hand is placed upon the edge of a table so that the weight can exert a traction and flexion type of pull. The amount of the weight and the length of time that this force can be applied is gradually increased. This procedure is good for the extension tendons and muscles as well. The patient is encouraged to work his finger against this resistance. Active exercise under warm water is also carried out at this stage, for in addition to its heat the water offers a slight resistance.

The principle of a light force maintained over increasing periods of time is applied by means of a cotton elastic (ace) bandage. The wrist is first immobilized in a cock-up position by a splint. Then the elastic bandage is begun by applying it to the forearm and bringing it down individually over each finger that is stiff, returning the turn of the bandage to the forearm again. In this way there is tension put on the individual stiffened fingers tending to pull them into the hand's position of normal function. A wooden windlass can be placed in the cords of bandage leading from the tips of the fingers to the volar surface of the forearm. By turning the windlass the tension can be increased. This type of bandage is put on at first for only two hours and later the time is increased until it is in place all night. Dr. Bering does not advise use of this bandage for a period longer than three weeks.



Another apparatus that was extensively used for the stiff finger employed the principle of light rubber band traction. The stockinet is cemented to the fingers needing correction as before. The forearm is then placed in plaster which extends to the distal flexion crease of the palm with the wrist in a cock-up position. A wire ladder splint is incorporated in the plaster, running along the volar surface of the forearm up in a wide circular sweep around the hand and then being attached to the dorsal surface of the forearm. The rubber bands are attached to the stockinet at the tips of the fingers to the rungs of the ladder splint producing slight tension. At intervals the rubber bands are attached to a lower rung of the ladder splint which brings the fingers into greater flexion. The patient is required to exercise his fingers against the resistance of the rubber band by extending the finger. Dr. Bering uses this extensively in the prolonged treatment of stiff finger joints.

Other types of apparatus used in the correction of stiff finger joints are as follows. Two bits of wood carved to fit the grip of the hand, and held together by springs, are used to strengthen the muscles as the patient tries to squeeze the pieces of wood together against the action of the springs. Springs of variable tension can be inserted. A wire frame is used which contains many different sized nuts on it. A spring lies under these nuts so that as one tightens them down on the thread one works against the springs which are of variable tension. Finally a box with push buttons on it like an adding machine is so constructed that it requires gradually increasing application of force with the finger tip to push the buttons higher up on the box.

Thus far there has been detailed only the exercises which are specifically for the fingers and are taken individually. This occupies only a small part of the time in which an individual with stiff fingers is employed in this rehabilitation hospital. It is important that the patient should keep his finger joints moving to the extent of his ability throughout the day. Thus from the standpoint of time involved, more time is spent by the patient in group exercises and sport.

The group exercises are an extremely important part of the individual's rehabilitation. They are directed by trained women gymnastic teachers. Patients with the same degree of strength are placed in the same exercise groups irrespective of the type of wound sustained. Exercises usually begin with the feet and progress over the whole body to the hands. Breathing exercises are included. The



wounded part is exercised last. The usual routine is to give 50 minutes of group exercise, followed by 5 minutes rest and then 10 minutes of individual exercise, as has already been described in the case of the fingers. Attention was then turned to partnership exercises, which will be described. Finally the patients engaged in some sort of sport, such as swimming or rowing on the lake, tennis, tug-of-war, mountain climbing etc.

### Partnership Exercises for Fingers

These deserve special mention because of their value and the importance which was attached to them. Four patients take part, one pair opposing the other. A round wooden wand about two and one half inches in diameter is grasped by the four men facing each other in pairs. Two acting as partners attempt to roll the wand in their hands while the others attempt to prevent the rotary motion of the wand. In this way the element of competition is introduced. In like manner the partners can vie with each other in pushing the wand toward or pulling it away from their opponents.

### Group Exercises Designed for the Fingers

The patients sit in a circle and a light ball such as a basket ball is thrown gently so as not to hurt anyone catching it. It must be caught lightly so that no noise is heard. All movements are made slowly. During this exercise the patients should be relaxed with their minds off the wounded hand so that it works naturally and smoothly with the normal one. Gradually heavier balls may be substituted. A game may be introduced by forming the patients into lines and seeing which line can pass the ball from the end to the head of the line first.

### Special Exercises for Specific Purposes

Climbing up inclined boards is good for stiff muscles, while climbing a ladder is considered good for stiff backs. For patients who have stiff shoulders and are inclined to hold the arms closely to the sides, the same principles of a light force continued over a long period of time, and of exercise against resistance are applied. A removable thoracic plaster cast with a wooden rod projecting out from the stiff shoulder at an angle of 60 degrees is used. Cords are dropped from this rod to cuffs which are placed about the patient's upper and lower arm. Windlasses in these cords could then be used to apply light force to draw the arm out and away from the body in order to restore the motion of elevating the arm to the shoulder joint. Similarly, with



the patient seated on a bench, the stiff shoulder can be fixed with a strap around it and the bench. A cuff attached to the upper arm is fastened by a cord over a set of overhead pulleys to a weight which tends to pull the arm up. The patient can then exercise against this resistance, and these principles are applied to all stiff joints.

### Breathing Exercises Following Thoracic Wounds

The chief purpose of these exercises is to teach good expiration. This was accomplished in the following way. The patients were asked to blow into a spirometer or a balloon. The muscles of the thorax were strengthened by giving arm exercises against resistance in all directions and by turning the body against such resistance. The muscles of the abdomen were strengthened by the usual well known methods. The patients were asked to sit cross-legged on the floor, between two upright wooden wands. They then grasped the wands with the hands at a level above the head. Breathing in this position is said to turn the thoracic muscles out. As the patients became stronger they performed this breathing exercise while they lifted their weight off the floor with their hands. They were also taught to expand the chest locally over the injured area by learning to breathe deeply in this area, first against the resistance of the nurses' hands and then against the resistance of their own.

### Non-operative Measures for Stiff Finger Joints when Conservative Measures Fail

All that can be expected of this method is to correct fingers stiffened in the extended position and to put them into the position of function. Dr. Bering believes that it is always worth trying. A circular plaster cast is placed on the forearm with the wrist in the cock-up position. Sheets of plaster one inch thick are then placed over the volar and dorsal surfaces of the stiff fingers, with padding over the finger joints and between the fingers. The fingers are then bent as much as possible without an anesthetic and the plaster allowed to harden. If pain results after the application, the plaster is not left on more than two or three days. If there is no pain it may be left on eight or ten days. After the plaster is removed, the fingers are given three days' rest, and then if the swelling has subsided the plaster is reapplied, bending the fingers still more. When the fingers have been bent by this method to the desired position, they are put up in the apparatus utilizing rubber band traction and the circular wire ladder splint as previously described. The principle of course has long been applied to other joints.



Treatment of Amputees

As soon as the stump has healed, banding with an elastic bandage is continued for from two to three weeks. As a rule no pylons are used as Dr. Bering believes that the temporary use of a pylon teaches the patient bad walking habits in the use of his permanent prosthesis. The only occasion when pylons are permitted in this hospital are in the case of bilateral amputations, or if the patient cannot use crutches because of injuries to the arms. The patients are given a crutch to enable them to get about and are then kept employed in exercises and a sports program lasting the full day. They are taught to do everything without making any allowance for the amputated leg. For example, they play football. Perhaps a team of soldiers with thigh amputations will play a team with amputations through the leg. They spend six weeks at the Sports Hospital getting into condition. They are then sent to a special hospital for amputees at Herrsching, Bavaria. There they spend three or four weeks getting the prostheses adapted. They return home a month and then come back to pick up the finished prostheses and attend Geschule (walking school). Dr. Bering stated that his patients needed very little Geschule.

Recommendations

None. The need for this type of hospital has ended.

University of Innsbruck  
Interview with  
Dr. Sallis, Assistant in the Surgical Clinic,  
27 July 1945

General

The clinics are all housed in the Allgemeines Krankenhaus, a group of buildings which could be described as old but adequate. Dr. Burghard Breitner, who had been professor and chief of the clinic for 15 years, was on an errand to the French military government and could not be located during the time available. Prof. Breitner had been consultant to a group of military hospitals in that section of Austria during the war and consequently had no time to do any new surgical investigation.

A study of frostbite had been made at this clinic. By means of arteriograms they have shown that patent large arteries often exist 6 to 15 cm below the level where the skin changes are found. Gradual warming is the basic principle in the treatment of these cases and procedures are instituted as soon as the patients are admitted. When the patients reach the reserve hospital warming with short wave therapy is introduced. Except for this there is no essential difference in their treatment from that usually employed.



University of Erlangen

Interviews with

Prof. Otto Goetze, Professor of Surgery,  
Prof. Heinrich Westhues, Professor Ordinarius of Surgery  
Prof. Freidrich Jamin, Professor of Pediatrics  
(in charge of frostbite of the extremities)

30 July 1945

General

The surgical clinic is housed in a 100-year old hospital building with a capacity of 210 patients. During the war and at the present time both military and civilian patients are treated in this clinic. The wards are clean, light and well ventilated with proper spacing between the beds. The operating suite consists of four huge operating rooms which were in a disordered and unsanitary state. They resembled storerooms with an operating table in the center. All the numerous supplies needed in an operating suite are placed about the walls. For example, there were various types of splints piled high on tables along one wall of the professor's operating room. Tables along the other wall were covered with bottles containing drugs and supplies of suture material. The floor under these tables was not clean. The implication of this jumble of storage material serving as a repository for bacteria laden dust is all too obvious.

The aseptic technique used was at the same low level as was observed elsewhere. The professor performed a colostomy with his hands ungloved during the exploratory phase of the operation and then put on fine cotton net gloves to complete the operation. Single layer muslin masks hung at about the level of the lower lip were used by the professor and his assistants. The anesthetist and the observers had neither caps nor masks.

Prof. Goetze impressed one as a rather uncritical individual whose chief interests were his private patients and the preparation of material for the publication of a book on carcinoma of the rectum. He spent a good deal of time each day in a large room of his own with numerous excellent colored illustrations covering a large table.

There were four assistants in the clinic with from five to fifteen years of post-graduate experience. They have all been recently returned from the army. In addition Prof. Goetze has one female assistant whom he trained during the war. These assistants seemed alert, progressive and competent when questioned on their practice and on their special fields of thoracic, neurologic, vascular and urologic surgery.

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Comment on Surgical Methods

Prof. Goetze's opening statement was that infection is the greatest problem in war wounds. Further questioning revealed that all wounds were handled as infected wounds, being unable to treat the majority of them as clean at the end of the first few days as in the U.S. Army. In the early phases their use of wound excision, debridement and wound toilet was similar to ours, but they had no conception of the use of sulfonamides in the prophylaxis of wound infection. Nor did they employ secondary closure of wounds at all. The professor stressed the point that in the 1940 campaign against France, much better results were obtained in the treatment of wounds. This he attributed to good nourishment and lack of fatigue on the part of the soldiers.

Traction in plaster by means of Kirschner wires was employed for transportation of patients with fractures of the extremities. When a reserve hospital was reached, the plaster was removed, but traction was maintained. Prof. Westhues stressed the importance of absolute immobilization of compound fractures with osteomyelitis by means of bone tongs which grasp each of the bone fragments and are attached to a rigid wooden exterior frame. Plaster was used in addition to further ensure immobilization. He believed that subsidence of infection and bone union occurred in half the usual time when this method of treatment was employed.

Internal fixation of simple fractures is not done by plating, as they believe that this interferes with healing. Instead the fragments are fixed with from one to three steel wires placed about the circumference of the bone. Prof. Goetze has devised some instruments whereby he places these wires subcutaneously through only two tiny incisions 2 cm in length.

This clinic also employs the Kuntscher nail, though only in cases of non-union where a bone graft will not be necessary. This method has been used fifteen times and they state they have had only one infection. However, the professor admits that he has heard of three more deaths due to fat embolism. One of the assistants inserted vaso-selectan into the narrow cavity at the time the nail was withdrawn and an excellent venogram of the femoral vein was obtained. After discussing and observing the use of this nail with the Germans, it appears to both an unreliable and a dangerous procedure. Infection and death are all too common sequelae of its use in their hands.

Two departures from our custom were found in their treatment of frost-bitten extremities. In the stage when



the extremity is swollen, cold and blue in color, they make numerous excisions, each 1 cm in length and deep enough to enter the subcutaneous tissue. The purpose of this is to allow congested venous blood to escape so that arterial blood may enter. The procedure should be discouraged as it fails to achieve its purpose and exposes an extremity with a damaged circulation to the certainty of infection. In this clinic again, the use of heat in the extremity with vascular damage is advocated by employing short wave therapy. While on both a theoretical and practical basis, this seems more dangerous than beneficial, its repeated use in the German Army suggests that the practice should at least be reviewed with an open mind. It should be subjected to an experimental investigation.

The German treatment of burns was years behind. Tannic acid was preferred locally, and the general treatment did not include any method of control of the amount or type of infusion employed.

There were no advances in blood substitutes. They felt that fresh whole blood given by the direct method was superior to preserved blood. This belief must certainly have severely limited the availability and quantity of blood that could be given to soldiers needing it.

There were no new measures for the early detection of gas gangrene. Amputation was the basis of treatment, with antitoxin used additionally. Amputation was therefore frequent.

Amputation was resorted to not only for gangrene but also for severe septic complications in an extremity because of the fear of systemic results of sepsis. This fear is bound up with their lack of understanding of the use of sulfonamides and their complete lack of penicillin.

Continuous suction for three or four months is the accepted treatment of chronic empyema. If this fails, thoracoplasty is employed.

The sponge rubber drain is used in cases of brain abscess. If there is much drainage and the drain becomes clogged, it is removed and cleaned as often as once a day.

The choice of treatment of arterio-venous fistula is to excise the vein and suture the opening in the artery. Local heparinization is not used, but they have an intramuscular product. Four cases treated in this manner were seen, all with normal appearing extremities and a pulse present in two of the cases.

Treatment of War Wounds in General

Cibazol (sulfathiazole) was applied locally at the dressing station and the wound dressed. Four grams were given by mouth and thereafter one gram every four hours until a total of twenty grams had been given over the three day period. At the forward hospital wound excision was the regular practice in all instances except small bullet wounds. Following excision wounds were left open, with the exception of wounds of the face, brain, chest and joints, which were sutured. In the Russian campaigns it was often 48 hours or more before the soldier reached the forward hospital. In these instances wound toilet alone was performed. In the fixed hospitals, secondary suture was never done, nor was early skin grafting. The wounds were allowed to heal by granulation and contraction. Sometimes small Thiersch grafts were used to hasten healing. Large split thickness grafts were not employed. Infection of wounds was the rule rather than the exception.

Use of Sulfonamides in Surgical Cases

The basic German belief is that when sulfonamides are employed as anti-bacterial agents, they should be given at a single stroke - a "Cibazol Stoss". Following this dose the sulfonamide is rarely used again, or if it is an interval of two days must supervene. There is no attempt to maintain the blood concentration of sulfathiazole at any particular level and blood level determinations are never made.

The belief is also held that if sulfathiazole is given continuously, it will mask the increase in temperature and pain which would otherwise indicate a septic condition requiring surgical treatment. Therefore sulfathiazole is discontinued after three days and if the temperature remains elevated they conclude that the drug has failed and further treatment should be surgical only. Sometimes another "Cibazol Stoss" may be given after the surgical operation, but if at the end of three days after this second "Stoss" they still find an elevated temperature they will not use sulfathiazole again.

It is also thought if sulfathiazole is continued for more than three days that the bacteria will develop resistance to the agent. This is an added reason for employing the short courses. Sulfadiazine has not been used at this clinic.



### Treatment of Compound Fractures

Infection was the rule in these cases. The wounds were never closed and the treatment they received was essentially the same as that given to infected compound fractures. The usual procedure was to incorporate a Kirschner wire, passed through the calcaneus for traction, into the long plaster cast used for transportation of these cases. The traction was then maintained at the fixed hospital by a weight suspended over the bed and the plaster removed.

The wire was not allowed to be placed through the femur or the tibia as this would necessitate the traction being applied with the thigh in the partially flexed position. Traction was not employed in this position because of the fear of "sinking infection", that is infection originating in a thigh wound and following along Hunter's canal until it entered the pelvis. Sepsis of this type often caused the death of the patient, and the Germans believed that the partially flexed position of the thigh disposed the patient toward infection which would "sink" by gravity into the pelvis. Another reason for placing the Kirschner wire in the calcaneus was that forward surgeons could not be trusted not to put the wire through the knee joint.

Prof. Westhues, an army consultant, was interviewed. After having been professor ordinarius at the surgical clinic at Erlangen, Westhues became a consulting surgeon for the Chinese Army in the early years of the Sino-Japanese war. His experience with the German Army was largely in the Russian theater. The professor demonstrated his method for the rigid fixation of compound fractures during transportation of the patient, and also during the definitive treatment while in the hospital. Details of his treatment are contained in a small book which he has published, a copy of which is appended with this report. Both he and Prof. Goetze were very enthusiastic about the results obtained in the healing of infected fractures. Prof. Westhues has described this treatment, plus a useful device for treating decubitis ulcer, in a monograph, "Fortschrittliche Lagerung und Behandlung Schwerverwundeter", Berlin, Springer Verlag 1944. A copy of this monograph forms part of this report. A sample of the apparatus used to control the bone fragments which are fixed with Kirschner wires has been forwarded to Secretariat, CIOS.

### Treatment of Frostbite

Prof. Friedrich Jamin of the Department of Pediatrics was interviewed on the treatment of frostbite. He had been

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chief of a military hospital in Erlangen to which this type of case had been sent.

His cases did not receive the multiple puncture treatment as advocated by Prof. Goetze. On admission they were placed in bed with 20 cm elevation and kept dry. A cradle was employed to protect them from the bed clothes. The patients were not permitted to smoke. Blisters were never opened. Sulfathiazole powder mixed with lactose was applied locally (lactose was considered to have a drying effect). Lumbar sympathetic block was seldom employed as it was considered of doubtful value.

Short wave therapy was administered for 20 minutes daily on all types of cases regardless of the stage or degree of involvement, and it was stated that the temperature of the foot was kept from 38 to 40°C during the treatment. However, this was probably inaccurate as only the back of the hand was used to determine the temperature. (The types of electrodes used are illustrated in the published report attached.) Treatment was continued until the patient was able to walk about free of pain, or until gangrenous areas had separated spontaneously. Prof. Jamin stated that he has observed an improvement in the circulation of the nail bed by means of the capillary microscope while the patient was receiving short wave treatment.

This type of treatment had not been controlled by cases receiving the same treatment without short wave diathermy. Prof. Jamin declared that he had never seen a non-gangrenous case develop gangrene under treatment with short wave. He feels that demarcation occurs more rapidly and that there is less associated pain in cases treated with short wave. During the first two winters in which he operated the hospital, there was no short wave treatment and the number of amputations was high. In the following winters after institution of short wave there were many fewer amputations. Prof. Jamin's technique is described in "Die Wissenschaftlichen Grundlagen der Behandlung der Erfrierungen mit Kurzwellendurchflutungen" in Sitzungsberichte der Physikalisch-medizinischen Sozietät zu Erlangen, pages 77-102, 73 Band 1942.

One of the assistants in Prof. Goetze's clinic said that he used Priscol in 10 mg doses directly into the femoral artery twice a day. He considers it to be the best of vasodilators when administered in this way. Priscol is 2-Benzylimidazolin hydrochlor.

Prof. Goetze was a consultant for the German Navy. He wrote their standard procedure for the treatment of burns. It is quoted as follows:

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Local Treatment. Application of cod liver oil directly without washing or debridement.

(He prefers debridement and tannic acid in civilian life, but says there is not enough water in the Navy to provide a tannic spray and not enough time to debride.)

General Treatment. Warmth, morphine, Vitamin C, adrenal cortical hormone, diet without meat or albumin to prevent extra renal azotemia, and infusions of saline-glucose and plasma together with multiple small blood transfusions. This general treatment is controlled only by hemoglobin estimations, blood pressure, pulse and the general condition of the patient.

### Recommendations

While the professor and chief of the clinic does not appear to be very aggressive or active, the work as a whole seems satisfactory. Ward rounds were made and the assistants had evidently been taking very rational care of the patients on their respective wards. It is recommended that the clinic be permitted to continue functioning as it is.

V. SUMMARY

Medical education in Germany during the war seems to have been affected by the same factors which have operated in the Allied countries. The deterioration has probably been much greater in Germany, partly because these factors operated more strongly and partly because of a very considerable decline before the outbreak of war.

Before 1933 the German medical student entered a University after a total of 13 years of schooling which included a rigid "classical" education in a "gymnasium". He spent five semesters in preclinical studies and five or six semesters in clinical studies. As more and more political ideology and Youth Movement material was added to the preliminary education at the expense of the more broadening cultural fundamentals, medical faculties began to note the effects of inadequate preparation. These effects were multiplied when in 1938 the total schooling required for admission to a medical course was reduced by a year, this being spent in additional military service or in work on the land. A further reduction by one more year, which occurred during the war, and a reduction from five to four preclinical semesters left many students so poorly prepared for intensive preclinical studies that special classes were organized in some places to remedy deficiencies. Although they felt that the outstanding students were as good as the best of previous times, most members of medical faculties recognized clearly that the average student was not so good and volunteered that examinations had been made less exacting.

It was not possible to gather from the incumbents what the effects of displacement of medical teachers for reasons not connected with their professional ability had been. However, recent changes by occupying agencies did not seem to have affected morale very much, perhaps because of previous experiences with governmental regulation, or because of pre-occupation with more serious worries as to food and shelter. The numerical reduction in teaching staff, which had been extreme at times during the war, not only affected teaching and the care of patients, but seemed in many instances to have produced fatigue and lack of interest in anything outside the daily routine.

The high degree of standardization of the curriculum of German medical schools so that whole companies of students could be transferred from one school to another, depending upon the availability of barracks and without reference to



the adequacy of teaching facilities and staff, placed a tremendous load on some schools and had a much worse effect than a general increase of fifteen or twenty percent in the number of students would have produced alone.

Germany experimented with an accelerated program of medical teaching at the beginning of the war, by having schools give three semesters instead of two in each year. This nearly continuous teaching was officially stopped at the end of two years, having been found totally unworkable because the students had no time interval in which to work as volunteers in hospitals. The armed forces persisted, however, in withdrawing students from school in mid-course for a period of a year or more of service with troops. This was generally regarded as disadvantageous to the student because he came back not only "rusty" in learning, but with a tendency to be superficial.

Militarization of fifty percent of the student body was not regarded favorably by any teacher, because drill and political lectures encroached on the students' time, barracks were often unsuitable for study and there were constant interruptions because student companies were regarded as a source of labor in such emergencies as the gathering of crops.

In the absence of any pre-war requirement of an internship the armed forces simply assigned students to duty as soon as they had passed qualifying examinations without apparent effort to arrange a period of hospital work. In exceptional instances a man might secure added training under a qualified specialist in a military hospital, but all the usual positions for special training were filled by women or by men physically disqualified for the army. After five years this policy began to show serious effects, but no plans to improve the situation had been made.

Finally, a factor which affected some schools much more than others was that of interference with teaching schedules because of air-raid warnings. It was found to be impossible to continue any form of teaching during an alert and a considerable reduction in teaching hours occurred during the final year of daylight bombing.

German medical experiences, though generally similar, varied considerably in some respects from accepted British and American practice. The outstanding factor seems to have been a totally different philosophy of the use of sulfonamides

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arising from their ignorance of how to administer these drugs so as to secure optimal response. Their dosage was entirely empirical because no blood sulfonamide levels were done. This made selection of the drug to use somewhat haphazard, but they arrived at the same conclusions as we did as to relative efficacy and used mostly Cibazol and Globucid.

The failure to do blood sulfonamide levels was not due to ignorance of the method, but apparently to an ingrained belief that sulfonamides can only help the patient survive a pathologic process, not actually arrest. Therefore only enough of the drug is given to make the patient better, if possible, and then it is withdrawn so as to unmask the pathology present. This notion that the underlying process continues almost unabated, while the drug obscures the clinical picture, recalls our own discussions of seven years ago as to whether sulfanilamide was an antipyretic as well as a bacteriostatic agent. It would seem that the Germans got off the track about that time and that their great emphasis on the pathology of "inflammation" has served to keep them off. At any rate their treatment of medical and surgical infections consisted of what we would regard as small doses of a sulfonamide over a three-day period, after which the drug was withdrawn until the clinical status could be re-evaluated. The prophylactic or preoperative use of the drugs was never considered and the general tendency was to delay starting the drug until it appeared absolutely necessary.

This limited application of the sulfonamides clearly resulted in a tremendous increase in total hospitalization, permanent disability and probable mortality among medical and surgical cases. On the medical side pneumonia and other respiratory infections, meningitis and scarlet fever were very inadequately treated, while the whole picture of the handling of wounds was changed for the worse.

Starting as we did with local application of sulfonamide powders, they had concluded this procedure to be of limited value without progressing to the idea of initiating early oral treatment. Therefore all wounds became infected and secondary closure could not be done. Even after a prolonged healing period, a fear of "sleeping infection" delayed necessary secondary procedures such as nerve suture for from 6 to 9 months. The odor of osteomyelitis was said to be common in military barracks, drainage from wounds was regarded as "benign" if the patient was well enough to take rehabilitation exercises, and amputation was performed in cases in which it would not be justified if wound infection had not been so nearly universal.

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The impression that sulfonamide dosage in medical and surgical conditions was too small is given added weight by the fact that the complications of treatment with sulfonamides were regarded as completely inconsequential. No effort to control urinary acidity or fluid intake was ever made and urologic complications other than minor hematuria appear to have been unknown.

It is only fair to add that all the difficulty with wound infection cannot be explained by poor application of sulfonamide therapy. There was also evidence of carelessness in the use of aseptic methods which must have contributed a great deal.

While the long delays in healing incidental to their treatment of war wounds led the Germans to many maneuvers, often quite ingenious, to maintain or restore function, the preventable nature of most of the conditions they started with reduces the significance of a detailed report on this phase of treatment. It is of some interest that serious efforts to rehabilitate physically and mentally the permanently handicapped amputee for civilian life were not paralleled by any attempt to recondition the soldier who was to return to duty. When he was able to leave the hospital he was returned to limited assignment. If he improved further he was then returned to combat.

In addition to war wounds, the chief cause of disability was epidemic hepatitis. This was common in both army and civilian practice, but no advances in preventive treatment or in the clarification of etiology seem to have been made. The subject of homologous serum jaundice had never come up. Malaria and dysentery had been problems in the army but not in the civilian population. The treatment of malaria failed to prevent recurrences and in the absence of any equivalent of sulfaguanidine, Cibazol was thought to be of greatest value in dysentery because it shortened the disease to about a week. Atypical pneumonia was apparently unknown in Germany and infectious mononucleosis was not common. "Muscular rheumatism" had been a problem in the army, but most cases were retained in the service. The prevalence of infectious poly-neuritis and post-diphtheritic paralysis had aroused interest but no advances had been made.

The treatment of syphilis by bismuth and neosalvarsan and the treatment of gonorrhea by sulfonamides appeared to have been accepted as standard in spite of all the disadvantages we recognize. Cultural methods were not used in gonorrhea.

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New facts or points of view were elicited with relation to four specific problems, for which the reader is referred to the recorded interviews. These were "War Nephritis" (see pages 22, 38, 49, 58), "War Ulcer" of the stomach (pages 53, 58), the treatment of Frostbite with heat (page 99) and a peculiar clinical syndrome which was described but not seen characterized by marked arterial hypotension (page 63).

Interesting ideas were presented with relation to the detection of lateral sinus thrombosis with a thermocouple (page 10), the use of the Krukenberg stump which separates the radius and ulna as functioning entities (page 76) and electrically operated prostheses for the hand (page 86).

In general it can be said that German medicine and German medical schools are so far behind the times that several years of reorientation and reorganization of teaching plans will be necessary if the German physician of the future is to be equipped to secure and maintain a level of health in the population which will protect the people who live in geographic proximity.



VI. LIST OF REPRINTS SUBMITTED  
TO SECRETARIAT, C.I.O.S.

Dr. Hans Franke

Der Einfluss des Valsalvaschen Pressversuches auf die Herzstromkurve bei internen Krankheiten.

The influence of Valsalva's compression experiment upon the electrocardiogram in internal diseases.

Der Wert der vergleichenden Venendruckmessung und Kreislaufzeitbestimmung im Bereich der Stromgebiete der oberen und unteren Hohlvene.

The value of comparative measurements of venous pressure and circulation time in the regions of the vena cava superior and inferior.

Über den Wert der röntgenologischen Darstellung von erweiterten Bauchwandvenen (caput Medusae).

The value of roentgenologic demonstration of dilatation of the veins of the abdominal wall (caput medusae).

Dr. Burkhard Kommerell

Cholecystographie mit Detailstudium

Detail studies in Cholecystography.

Die Entstehung von Gallensteinen in Angeborenen Gallenblasen-divertikeln.

The formation of gallstones in congenital diverticuli of the gall bladder.

Das Problem der Gallensteinentstehung vom Standpunkt der Röntgenologie.

The problem of gallstone formation from the point of view of roentgenology.

Können kleinste Röntgenologisch erkennbare Gallensteine unter Allen Umständen in der Operativ Freigelegten Gallenblase Getastet werden?

Can roentgenologically recognizable gallstones of smallest size be always palpated when the gall bladder is exposed during operation?

Fehler der Deutung und der Beurteilung des Röntgenbildes beim Ulcus.

Mistakes in interpretation and evaluation of the roentgenogram in ulcer.

Neuere Gesichtspunkte beim Röntgenstudium der extrahepatischen Gallenwege.	New viewpoints in roentgenologic study of the extrahepatic gall ducts.
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Die Rechtslage des Aortenbogens	Dextraposition of the aortic arc.
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Choledochographie	Choledochography.
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Schwebende Gallensteine - ein cholezystographisches Kunstprodukt.	Floating Gallstones - a cholecystographic artefact.
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Verkalkte Herzklappen im Röntgenbild	Calcified valves of the heart in the roentgenogram.
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Fortschritte der Cholezystographie	Progress in cholecystography.
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Kommerell and Engel

Zur Diagnose des Gallenstein-ileus	Contribution to the diagnosis of gallstone ileus.
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Kommerell and Roemheld

Klinik und Röntgenbild der Aneurysmen der Bauch und unteren Brust-aorta.	Clinic and roentgenology of aneurysms of the abdominal and the lower thoracic aorta.
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Kommerell and Wolpers

Gas haltige Gallensteine.	Gas-containing gallstones.
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Röntgenologische Beobachtungen über das Gallensteinwachstum und die Steinverkalkung bei Kalkgalle.	Roentgenologic observations on the growth of gallstones and on calcification of gallstones in calcium containing gall.
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Prof. Dr. F. Meythaler

Leber	The liver.
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Galle	Gall
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Die Sicherungsfunktion des Adrenalins (Klinische Wochenschrift, 13 Apr 1945). The "securing function" of adrenalin.

Die Sicherungsfunktion des Adrenalins (Archiv.f.experim. Pathologie und Pharmakologie, 178. 330. 1935) do.

Die Sicherungsfunktion des Adrenalins (Verhandlungen der Deutschen Gesellschaft für innere Medizin, 1935) do.

Zur Pathophysiologie des Ikterus. Pathophysiology of icterus.

Über Spontanhypoglykämie On spontaneous hypoglycemia

Zur Pathogenese und Klinik des parenchymatosen Ikterus. A contribution to the pathogenesis and clinic of the parenchymal icterus.

Spontanhypoglykämie. Spontaneous hypoglycemia.

#### Meythaler and Ehrmann

Über Spontanhypoglykämien. On spontaneous hypoglycemias.

#### Prof. L. R. Müller

Über das Aufwachen, das Bewusstsein und über Weltanschauung. On wakening, consciousness and philosophy of life.

Über die erholende Kraft des Schlafes. On the recuperating power of sleep.

Über die Ursachen der Schlafbewusstlosigkeit. On the causes of unconsciousness in sleep.

#### Prof. W. Usadel

Erfahrungen mit der Gaumenspaltenoperation nach Axhausen. Experiences with Axhausen's operation for palatal clefts.

Die Neuralgie des N. glossopharyngeus und ihre chirurgische Behandlung. Neuralgia of the glossopharyngeal nerve and its surgical treatment.

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Prof. Dr. Janker

Die Leuchstirm-Photographie, eine Übersicht der Finrichtungen und Arbeitsmöglichkeiten mittels dieser Methode im Röntgeninstitut und der Röntgen-Reihenuntersuchungsstelle.

Fluoroscope Photography, a review of equipment and utilization of this method in the Roentgen Institute and the Roentgen serial examination center.

Prof. Dr. Ernst Rodenwalt

Tropenhygienische Schriftenhefte - Kriegs Malaria.

Publications on Tropical Hygiene - War Malaria.

Dr. Heinrich Westhues

Fortschrittliche Lagerung und Behandlung Schwerverwundeter

Modern methods of handling the severely injured.

Prof. Dr. Friedrich Jamin

Die wissenschaftlichen Grundlagen der Behandlung der Erfrierungen mit Kurzwellendurchflutungen.

The scientific foundation of treatment of frostbite with diathermy.

Deutsche Alpen-Universität. Innsbruck

Personal und Vorlesungsverzeichnis, Sommer-Semester 1945.

Personnel and catalogue of lectures, summer term 1945.

Dr. U. Henschke

Über Geschwulsttheorien und die Möglichkeit der Entstehung der Geschwulstzelle durch Spontanmutation.

The Theory of Tumors and the possibility of the formation of tumor cells through spontaneous change.

Sonnenschutzmittel

Protection from the Sun.

Künstliche Sonnenbäder, Sauna und Sportanlagen als Vorbeugungsmassnahmen bei der Truppe

Artificial Sun-baths, Finnish baths and Gymnastic equipment to maintain fitness among troops.

Fortschritte auf dem Gebiete der Röntgenstrahlen - Über Rotationsbestrahlung.

Advances in the field of X-Rays, Radiation by Rotation.



Untersuchungen an Lichtschutz-  
mitteln.

Investigation of Protection  
against Light.

Über die Abhängigkeit des  
Ionisationsstromes vom Volumen  
bei kleinen Kammern.

The dependence of ionization  
~~currents~~ on volume in small  
chambers.

Die Bedeutung der Filter und  
Tubusstrahlung bei Nahbestrah-  
lungsröhren.

The significance of Filter  
and Tube Radiation at close  
range.

Erfahrungen mit Bestrahlungs-  
anlagen.

Experiments with Ray equip-  
ment.

Biologische und physikalische  
Grundlagen der Rot und Ultra-  
rotstrahlentherapie

Biological and Physical Funda-  
mentals of Red and Ultra-red  
Ray Therapy.

Dosismessungen bei Radium-  
bestrahlungen des Uterus-  
karzinoms.

Radium dosage in carcinoma  
of the uterus.

#### Henschke and Schulze

Physikalische und biologische  
Untersuchungen an kunslichen  
Ultraviolettstrahlern.

Physical and Biological  
Investigations of Artificial  
Ultraviolet rays.

Methoden zur Ausmessung von  
Ultraviolettstrahlern.

Methods of measuring ultra-  
violet rays.

Wirkung der Sonnenstrahlung  
auf die Haut.

Action of the Sun's rays on  
the Skin.

Über Pigmentierung durch lang-  
welliges Ultraviolett.

Pigmentation through long-  
wave Ultraviolet.

#### Friedrich, Schulze and Henschke

Beiträge zum Problem der Radium-  
dosimetrie. IV. Untersuchungen  
über die Grundlagen der Ionisa-  
tionsmethode.

Contribution to the Problem  
dosimetry. IV. A  
study of the basis of the  
Ionisation method.

#### G and U. Henschke

Zur Technik der Operations-  
bestrahlung.

The technique of operating  
lamps.

Gisela Henschke

Über den photochemischen Prim-  
ärvorgang und das Zustandekommen  
der Wirkungskurve bei der  
direkten Pigmentierung durch  
langwelliges Ultraviolett,

Physikalische und biologische  
Untersuchungen an Lichttherapie-  
kohlen.

Siu-Mou Tsao

Untersuchungen über die Eig-  
nung der Selenophotoelemente  
zur UV Dosimetrie

Preliminary and actual photo-  
chemical curve effects of  
direct pigmentation from  
long wave ultraviolet.

Physical and biological  
study of carbon-light  
therapy.

Study of the practicability  
of the selenium photo  
element in Ultraviolet  
dosage.

*Signed for team  
by. R. H. Henschke  
Capt. (MC) USNR.*



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